IT'S THE THOUGHT THAT COUNTS: DEVELOPING A MODEL OF DRIVER AGGRESSION BY EXPLORING THE UNDERLYING COGNITIVE PROCESSES

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Abstract

Driver aggression is a leading concern for drivers in highly motorised countries and has been found to contribute to collisions, yet it represents a neglected and poorly understood area of road safety research. In particular, driver aggression research has tended to overlook the value of applying theoretical advances from the field of general human aggression to understanding aggression in the driving context, and has only recently begun to consider the role that internal processes such as cognition play in contributing to driver aggression. As such, current understanding of the fundamental causes of driver aggression is limited. Accordingly, the current program of research aimed to investigate the cognitions involved in non-violent driver aggression, with a view to informing the development of a proposed theoretical model for driver aggression based on the General Aggression Model (GAM).

The proposed model was explored through a series of three studies. First, a large-scale qualitative study was conducted with 202 Queensland drivers. The aim of this first study was to contextualise the model by addressing gaps in knowledge regarding beliefs, attitudes, and cognitive processes in driver aggression. The results of this first study formed the foundation for the remainder of the program of research, which aimed to conduct a preliminary investigation of the model.

The first study made use of a novel and under-utilised qualitative methodology: driver diaries. Drivers completed a series of three structured driver diaries, administered online, to explore their thoughts about, and experiences with driver aggression. During one week of regular driving, participant drivers received a link to a private, online diary where they were required to identify and record their thoughts about, and response to the most negative event they had encountered over the past 48 hours of their driving. Diary questions explored the key constructs of the proposed model, encouraging participants to provide their thoughts about the event being reported, as they related to each stage of the proposed model.

Both a content analysis and a thematic analysis were conducted to analyse diary responses. The content analysis focused on establishing the frequency of different types of diary responses at those stages that represent the key constructs of the model. Results suggested that the most commonly described type of on-road event were events classified as erratic driving behaviours. However, these events were described as provocative because drivers in the sample perceived them as rude rather than

dangerous. Furthermore, the most commonly described causal attribution for events reported in the diaries appeared to be internal-stable attributions that focused on inherent personality traits of the offending driving. Finally, drivers' descriptions regarding the aim or purpose of their behavioural responses to provocations suggested that approximately one quarter of these were aggressive.

Five key themes emerged from the thematic analysis. First, diary comments suggested that for some drivers, anger and aggression is triggered by their perceptions that another motorist had intentionally violated driver etiquette by behaving rudely or discourteously. The second emergent theme concerned the purpose of aggressive responses for some drivers: these drivers wished to teach the target driver a lesson for perceived poor driving behaviour. To elucidate, those drivers who responded aggressively to events they reported in their diaries also described having taken umbrage at the offending driver's behaviour, and explained that the purpose of their aggressive response was to convey their criticism and disapproval of the other's behaviour, with a view to getting the target motorist to improve his or her driving in future.

The third theme captured an unexpected finding that appeared to protect against driver aggression, and was labelled "satisfaction and superiority". This theme reflected the comments of those drivers who described experiencing anger and frustration in response to the events they reported, yet also described a sense of satisfaction that was apparently evoked by having not retaliated with aggression. Finally, diary comments suggested that stereotypes about other drivers may be involved in the perception and appraisal of on-road events (theme four). Diary comments also suggested that on-road events that drivers experience regularly may be associated with aggressive responses (theme five).

The second study in the program of research also adopted qualitative techniques: in-depth follow-up interviews with 29 drivers who had also taken part in the driver diary study. The aim of the second study was to explore critical events reported in driver diaries, to obtain a richer understanding of the cognitions that were associated with these events, and explore the beliefs that informed driver perceptions of them.

Potential interview participants were identified on the basis of a set of selection criteria that pertained to the behavioural response they had described in their diaries. It was anticipated that choosing participants based on their behavioural response would

enhance understanding of cognitions underlying both aggressive and non-aggressive behavioural responses, by allowing for a deeper exploration of the thought processes involved in these responses with respect to the key constructs of the model. Interviews were conducted by telephone within 48 hours of the participant reporting the behavioural response in one of their diaries.

A thematic analysis was conducted on the interview transcripts, with codes reviewed and categorised with respect to their potential to inform the key constructs of the model. Four key themes, each with a number of subthemes emerged from this process. The first theme drew attention to some common beliefs, or ways of conceptualising the driving environment that may influence aggression, and consisted of two key subthemes. The first subtheme highlighted that some drivers considered other motorists' behaviour as substandard (e.g., negligent driving, failure to follow the rules, rude behaviour), but widespread. This appeared to prime drivers to expect to encounter poor driving behaviour. Additionally, the second subtheme comprised drivers' descriptions of negative reactions to their perceptions that driver etiquette had been violated.

The second main theme pertained to factors that appeared to influence drivers' perceptions of on-road provocations, and consisted of four key subthemes. The first subtheme suggested that a number of stereotypes about particular groups of drivers or vehicles may influence drivers' perceptions and appraisals of events involving these motorists. The second subtheme highlighted that for some drivers, negative emotions appeared to be partly due to the cumulative effects of repeated exposure to the same type of on-road event. The third subtheme concerned how drivers who reported experiencing provocative events directed towards them (e.g., being tailgated by another driver, or honked at by another driver) perceived the driver's intentions. While a small handful of drivers in the study did not perceive the other as aggressive, drivers who did consider the offending driver's behaviour as aggressive also perceived that their own driving behaviour was being criticised by the aggressor. Interestingly, drivers in the current study who described instigating these same behaviours (e.g., horn honking, tailgating) described the purpose of their responses as intended to criticise and communicate disapproval. These perceptions of aggression as a criticism were apparent in events that were described as having escalated: escalation of driving events appeared to be a stalemate between two drivers, each of whom believes he or she has been unfairly criticised by the other's aggressive behaviour.

The third and fourth main themes related to drivers' behavioural responses to provocations, and their thoughts and feelings following the response. Specifically, drivers whose responses were considered to be aggressive in the current study described the purpose of their response as intended to communicate criticism to the target driver. Of note, some of the comments classified under this theme highlighted the risks that some drivers were willing to take to convey their disapproval (theme three). Interestingly, some drivers described feeling immature or foolish after their aggressive response, but indicated they would be likely to repeat the behaviour in future (theme four).

The final study in the program of research used quantitative methods to investigate the key constructs of the proposed model and conduct a preliminary investigation of its key constructs. Aims of this study were to examine the contribution of each of the key constructs towards explaining aggressive and non-aggressive behavioural responses, and to explore the relationships between the constructs.

To conduct a preliminary investigation of the key constructs of the model, and apply the model towards understanding aggressive driving behaviour, the final study explored the extent to which the cognitions identified from Studies 1 and 2 could account for both aggressive and non-aggressive responses to provocations, as well as investigating the role of person-related factors. Factors were chosen on the basis that they had the potential to both increase (trait anger, anger rumination and hostility), and protect against (mindfulness and moral identity) driver aggression.

A sample of 430 drivers from across Queensland participated in a between-groups study where the experimental manipulation was the type of potentially provocative on-road event, presented in a short video vignette embedded in an online questionnaire. Vignettes were video footage of real-life; naturalistic, real-world, on-road events. Participants were randomly assigned to a vignette condition and completed a series of standardised measures assessing the person-related factors before viewing their assigned video vignette. After viewing the video, participants responded to questions assessing their perceptions of the event, likely emotional responses, attributions regarding the cause of the event, as well as questions assessing the purpose of their likely behaviour response to the depicted event. To conclude the questionnaire, participants responded to a purpose built questionnaire designed to measure the key cognitions identified earlier in Studies 1 and 2: participants were presented with a

series of statements each reflecting one of these cognitions, and were required to indicate the extent to which they agreed or disagreed with each statement.

An Exploratory PCA identified three different purposes of drivers' likely behavioural responses: responses where the purpose was to vent their anger or frustration; responses where the purpose to criticise another driver with a view to modifying behaviour; and hostile responses intended to antagonise or cause a nuisance to the target driver. Based on the definition of aggression adopted in the current research, responses where the purpose was to modify behaviour or to antagonise were regarded as aggressive, but responses were the purpose was to vent were not considered aggressive, as the intention does not appear to be to cause a negative impact on the other driver.

A Multivariate Analysis of Covariance was conducted with these three factors as dependent variables, to explore the effect person-related and cognitive factors on the purpose of drivers' behavioural responses to on-road events. The results revealed that the models for all dependent variables were significant. Firstly, drivers who tended to endorse non-aggressive responses were younger, endorsed internal-stable attributions more strongly and reported greater negative emotions in response to events. Additionally, non-aggressive responses were associated with stronger negative reactions to poor etiquette. Secondly, drivers who tended to endorse aggressive responses where the purpose was to criticise the target driver also tended to agree that poor driving should be reprimanded. Finally, and unexpectedly drivers who tended to endorse hostile responses in order to antagonise or threaten the target driver reported lower negative emotions in response to provocations.

The findings of the research highlight the important role that cognition and cognitive processes may play in driver aggression, and provide preliminary information regarding some shared beliefs about driving that may affect aggression through their influence on the perception and appraisal of on-road events. Additionally, the findings suggest that the purpose of aggressive responses for some drivers is to criticise the target driver, teaching them a lesson that they should improve their driving behaviour. Alternatively, another interpretation of the current findings is that the purpose of drivers' aggressive responses to on-road provocations may reflect tendencies to perceive themselves as a good drivers. Furthermore, the findings of the program of research suggest that minor provocations are common experiences for many drivers, and that some drivers appear to be prepared to engage in risky

behaviours to teach driver a lesson in response to these provocations. Considered collectively, patterns in the findings suggest that a self-fulfilling prophecy could be at work in promoting driver aggression, and that the proposed model could may be conceptualised as a framework for understanding how driver aggression behaviours become reinforced through activation of a self-fulfilling prophecy.

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List of Abbreviations

ARS: Anger Rumination Scale

AQ-H: Aggression Questionnaire Hostility subscale

CBT: Cognitive-Behavioural Therapy

GAM: General Aggression Model

MAAS: Mindful Attention Awareness Scale

MIS: Moral Identity Scale

SLT: Social Learning Theory

SMT: Social Maladjustment Theory

STAXI: State-Trait Anger Expression Inventory

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Name: Lauren Shaw

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Date: 20th October 2016

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Chapter 1: Introduction

1.1. Introductory comments

This chapter presents the rationale for the program of research by highlighting the importance of understanding the role of cognitions and cognitive processes involved in driver aggression based on an informed theoretical perspective. Driver aggression is regarded as a leading traffic concern by drivers in highly motorised countries, and has been identified as contributing to crashes, particularly rear-end crashes (AAA Foundation for Traffic Safety, 2009; Chliaoutakis et al., 2002; Mann, Zhao, Stoduto, & Adlaf, 2007). Despite the community concern and association with crash involvement, current understanding of the fundamental causes of, and motivations for driver aggression is limited. Although driver aggression is a complex area of road safety research, two key issues have been identified as having contributed to the current lack of understanding: the absence of a strong theoretical foundation to guide research, and a paucity of research examining the psychological processes involved in driver aggression.

First, the road environment can be regarded as a social interaction: it requires large numbers of road users to share roads, to interact with each other and to interpret each other's behaviour (Svensson & Hydén, 2006). While general human aggression literature highlights that behaviour, particularly social behaviour, is influenced by cognition; the internal, psychological processes that guide how events in one's environment are interpreted and appraised, these perspectives have only recently begun to be applied to understanding aggression in the driving context. Drivers will behave according to their perceptions of on road events; therefore, understanding the appraisal processes that precipitate driver aggression is crucial to understanding its underlying causes. Accordingly, understanding how drivers perceive and appraise the driving environment represents a key aim of the current program of research. Without a strong, evidence-based understanding of the psychological processes that give rise to aggressive driving behaviours, interventions to reduce them will be likely to have limited effectiveness.

Secondly, driver aggression research has neglected to adopt theoretical advances in the psychological approach to understanding human aggression and apply them to aggression in the driving context. The current program of research recognises the General Aggression Model (GAM; Anderson & Bushman, 2002),

which emphasises how person-related factors and situational factors influence aggression through the cognitions and emotions they generate, as a promising theoretical framework to guide investigation of these processes in the driving context. Accordingly, the current program of research aims to explore the cognitive processes involved in driver aggression with a view to informing the further development of a theoretical model for understanding driver aggression based on the GAM.

1.2. Scope of the problem

Road traffic crashes represent a leading cause of death globally, with 1.24 million fatalities annually: an impact that is comparable to communicable diseases such as malaria (World Health Organisation [WHO], 2013). An additional 50 million people suffer non-fatal injuries due to road collisions, resulting in considerable financial, social and economic costs running into the billions of dollars. Based on current trends, and without significant interventions, road traffic crashes will become the fifth leading cause of death worldwide(WHO, 2013).

Australia has been fortunate to experience a substantial reduction in road-related deaths since a peak of 3798 deaths in 1970 (Australian Bureau of Statistics, 2007). This decline has been attributed to the introduction of a range of road safety countermeasures, such as Random Breath Testing (RBT's), which saw subsequent countermeasures also give emphasis to overt risky behaviours that are receptive to deterrence-based enforcement such as speeding or mobile phone usage (Gibbs, 1979; Homel, 1983). However, in 2013, 1193 people were killed as a result of traffic collisions and recent trends indicate a plateau in road related deaths (Bureau of Infrastructure, 2014). This would suggest that while deterrence-based approaches may be successful in targeting overt risky behaviours, their effectiveness may be limited in targeting less well-defined or concealed risky behaviours, like driver aggression. Therefore, new strategies and interventions that address such behaviours are required to see further reductions in road-related deaths.

In addition, to further reduce road-related deaths, road safety research needs to move towards understanding why they occur in the first instance rather than seeking to simply deter unsafe driving practices. The dangers associated with driving a motor vehicle are extremely well publicised, but nonetheless, many drivers engage in driving practices that are known to be unsafe. As such, interventions seeking to

reduce dangerous driving would benefit from knowledge regarding the psychological processes that are fundamental to individual driving behaviour, which is particularly relevant to driver aggression.

To illustrate the need to better understand the psychological processes that influence driver aggression, consider the results of Australian driver surveys that suggest there may be a contradiction between reported beliefs regarding aggression on the road and self-reported aggressive driving behaviour. According to these surveys, driver aggression represents a leading traffic concern, with up to 91% of surveyed motorists indicating that they believe aggression on the road is increasing (Australian Associated Motor Insurers, 2007). However, these surveys also indicate a substantial overlap between victimisation and perpetration such that many drivers who report being the victim of driver aggression also report perpetrating it.

A survey by the Australian Associated Motor Insurers ([AAMI]; 2011) asked a sample of Australian drivers to indicate how they believe on-road provocations should be handled by drivers who are on the receiving end of them. Although the survey did not report how 'on-road provocations' were defined, the results indicated that while 87% of drivers stated that the provocation should just be ignored, over half of these same motorists admitted to perpetrating aggressive behaviours such as horn honking, tailgating and obscene gestures when provoked. Further, of these drivers, 82% also reported that they believed their own aggression was justified. Given the rather high rate of drivers in this sample who reported that provocations should be ignored (i.e., 87%), it is possible that such findings reflect social desirability responding (the issue of social desirable responding is discussed further in section 2.4.2). This suggestion is supported by the fact that the survey was conducted by an Australian insurance company (i.e., AAMI) and, thus, drivers may have felt a need to report more desirable responses. However, it also needs to be acknowledged that the survey was anonymous and research has shown that anonymity decreases the likelihood of social desirability biases (Gwet, 2008; Joinson, 1999). Overall, the findings highlight that there may be a misalignment between drivers' beliefs about aggression and behaviour such that some drivers who engage in traditionally aggressive behaviour may not regard their own behaviour as aggressive. Arguably, the existence of such a potential contradiction between beliefs and behaviours highlights the need to better understand the ways that drivers perceive the on-road environment, and how these perceptions may give rise to aggressive behaviour.

1.3. Research focus to date

The potential for serious consequences to result from behaviours that are typically considered aggressive led researchers to seek to identify the situational factors that enable driver aggression, and the personality traits that predict it. However, these factors have historically been investigated independently rather than exploring the interplay between them and importantly, how psychological processes interact with them to influence behaviour.

Driver aggression literature presents with a surprisingly marked paucity of theory proposed to understand the phenomenon. Social Maladjustment Theory (SMT) draws on Tillman and Hobbs' (1946) "man drives as he lives" axiom to propose that people who are aggressive in everyday life will likewise manifest their aggression on the road. Although there is some support for this theory, it tends to be limited to the extreme, violent behaviours that are not likely to be representative of most motorists' encounters with on-road aggression. To that end, the theory also falls short in accounting for the plethora of anecdotal evidence from drivers claiming to become atypically aggressive in response to minor provocations on road (Galovski, Malta, & Blanchard, 2006).

The most current theory of driver aggression is Shinar's Frustration-Aggression Theory (Shinar, 1998; Shinar & Compton, 2004). This theory applies the frustration-aggression hypothesis (Dollard, Doob, Miller, Mowrer, & Sears, 1939) to the driving environment and maintains that once drivers' reach their personal tolerance for on-road frustration, they will behave aggressively. However, this theory is now based on an outdated model of human aggression that has substantial limitations that mean it cannot adequately encapsulate the complex and dynamic nature of driver aggression. Of particular relevance to the current program of research, the frustration-aggression approach has limited capacity to account for the psychological processes that influence behaviour.

1.4. Difficulties and issues in driver aggression research

The absence of a strong theoretical framework to guide research has made investigation of driver aggression challenging. Perhaps a symptom the absent theoretical framework, driver aggression research is also hindered by the lack of a universally accepted definition of the construct, resulting in a body of literature marred with extensive disparity in the way driver aggression is conceptualised,

defined and operationalised. As a result, establishing an accurate indication of the prevalence of driver aggression has been problematic, as prevalence rates will vary according to the definition adopted; an issue that is also exacerbated by gaps in the available data due to underreporting. As such, some of the most informative data regarding rates of driver aggression can be obtained from self-report surveys, which are subject to a range of biases.

Driver aggression research has tended to study the behaviour from the perspective of a victim rather than consider the interlinked nature of the victim-perpetrator dynamic in the driving environment. Admittedly, this problem is difficult to overcome, as it is fuelled by a combination of methodological issues, attribution biases, an overestimation of one's own driving skills and the innate desire of humans to maintain a positive self-image (Delhomme, 1991; Lennon, Watson, Arlidge, & Fraine, 2011; Nederhof, 1985). Nevertheless, many studies have focused on describing driver responses to situations where they are presented as the victim, or determining how drivers respond to provocations. Fewer studies have encouraged drivers to consider their behaviour from both a victim and perpetrator perspective, to enable motivations fuelling drivers' behaviour when they are a victim to be compared to the motivations of the same individual when they are a perpetrator. The current program of research acknowledges the difficulty inherent in overcoming this issue, but hopes that exploring how the cognitive processes that influence how provocations are interpreted will shed light on the victim-perpetrator dynamic.

Although it is acknowledged that data are required to commence building theories, the goal should be to move beyond merely describing facets or characteristics of a behaviour to being able to explain and predict why the behaviour occurs. As has been noted by others in recent years (Glendon, 2011), traffic psychology research may be considered largely atheoretical. In the context of research into driver aggression, the noticeable absence of theory coupled with definitional issues (as discussed further in Section 2.4.1) mean that the research that is available cannot explain why driver aggression occurs. Although there is current evidence that describes features of driver aggression, the underlying reasons or motives that can explain why drivers engage in aggressive behaviour remain unclear and are in need of further investigation. This fragmented approach is reminiscent of early general aggression research, which was also limited by the domain specificity of theories proposed to explain it. In an attempt to redress this, Anderson and

Bushman (2002) formulated the GAM, to create a unifying framework. The GAM, through its focus on how person-related factors (e.g., gender, attitudes, personality characteristics) and situational factors (e.g., current mood, life stressors) interact to influence aggression through the cognitions and emotions they generate, was considered a vital conceptual step forward in understanding aggression and remains the most prominent theory of aggression.

1.5. Theoretical approach

The current research applies concepts espoused in the GAM to the driving context in order to inform the further development of a proposed theoretical model for understanding driver aggression that incorporates the dynamic interaction between personality, environment and cognition. It advocates a holistic approach to conceptualising driver aggression, emphasising the important role that cognitions are likely to play in driver aggression. To enable the proposed model to be examined from an empirically informed perspective in future, the current research focuses on enriching current understanding of the cognitions that guide driver's behaviour, and how they influence the appraisal processes that generate aggression.

1.6. Research aim and rationale

The aim of the current research is to address gaps in the current body of driver aggression literature by applying advances in general human aggression to the driving context to explore the role of cognition in driver aggression. In doing so, the research aims to elucidate some of the attitudes, beliefs and expectations regarding driver aggression to understand how they may give rise to it, as well as protect against it. This knowledge will then be applied to the development and investigation of the key constructs of a proposed model for understanding driver aggression based on the GAM, thus addressing gaps in the theory that has been applied to understanding driver aggression**.**

1.7. Scope of the research

Consistent with the GAM, the current research adopts a psychological approach to understanding driver aggression, focusing largely on the role of cognition. While it is acknowledged that many biological theories of aggression exist, consistent with a psychological approach, the interactive nature of the driving environment makes the way in which drivers' interpret their interactions with other drivers fundamental to subsequent behaviour. Furthermore, although biological

perspectives may be able to explain behaviour, for them to be most effective in informing interventions to modify behaviour, they are best used in conjunction with psychological theories, such as social learning theory, or social cognition theories that provide frameworks for understanding how behaviour is learned (Bandura, 2001).

Chapter Two will explore definitions of driver aggression, highlighting that the terms road rage and driver aggression have often been used interchangeably throughout the literature to refer to a broad range of behaviours with varying levels of severity. Much of the existing driver aggression research has focused on examining extreme forms of driver aggression that involve violence. While this research is undisputedly valuable, violent behaviour experienced on-road is comparatively rare and thus only represents the experiences of a minority of road users (Australian Associated Motor Insurers, 2011; Galovski et al., 2006). Arguably, extreme cases of road violence are driven by different motives and factors from those relevant to aggressive driving. Non-violent behaviours such as horn-honking, rude gestures and tailgating appear to be much more widespread and reflective of most motorists' experiences with on-road aggression, but there appears to be a perception in some literature that non-violent driver aggression represents an inconvenience rather than a threat to safety (Roberts & Indermaur, 2005b; Roberts & Indermaur, 2008). Although non-violent aggressive behaviours are not necessarily dangerous in isolation, their danger lies in the potential for these events to escalate; for example, responding to tailgating by slamming on the brakes. Therefore, the current research focuses on understanding non-violent forms of driver aggression.

Additionally, it is important to demarcate how the program of research will conceptualise person-related factors, situational factors and cognitive factors. It is possible to regard cognitive factors as an extension of person-related factors, as there are predictable individual differences in the way that people conceptualise their environments, which are likely to be influenced by trait personality characteristics (Bushman, 2002; Mischel & Shoda, 1995; Wilkowski & Robinson, 2008). Indeed, this approach is recognised by some theorists who maintain that an individual's personality can be regarded as a reflection of the consistent use of their schemas, scripts and other knowledge structures (Anderson & Bushman, 2002). In line with this view, the program of research recognises that cognition can be considered a person-related factor, and acknowledges that behaviour is ultimately the result of the

interactive effect between these factors. However, taking into consideration the exploratory nature of the program of research in investigating the proposed model, person-related, situational and cognitive factors will be treated as though they are independent constructs and the interactive effects of person-related factors and cognition will not be the focus of the current program of research.

The decision to conceptualise and explore person-related factors and cognitive factors independently was made for the following reason. As Chapter 2 will highlight, relative to the other components of the model (e.g., person-related factors) very little is currently known about the role of cognition. There is a small number of recent studies that have investigated attribution biases in driver aggression (Lennon et al., 2011; Wickens, 2009), but very few that have explored drivers' cognitions, beliefs and conceptualisations of the driving environment. Thus, in the absence of adequate knowledge regarding one the key constructs of the proposed model, it was not considered possible to meaningfully explore the interactional nature of the proposed model. Instead, the program of research sought to thoroughly explore this key construct of the model, to provide information that will allow future research to progress towards a full test of an interactional model. Nevertheless, as Chapter 5 will describe, although statistical interactions were not directly tested for their effect on driver aggression, basic relationships between person-related and cognitive factors were explored in an attempt to identify possible relationships to be explored in future research. To that end, how the program of research will characterise and distinguish between person-related factors, situational factors and cognitive factors will now be described.

The term "person-related factors" refers to demographic characteristics (e.g., age, gender) and central trait characteristics (e.g., trait anger) that are typical patterns of behaviour, thought, and emotion (Allport, 1937). Further, mirroring arguments that beliefs provide a filter through which stimuli are interpreted (Dweck & Leggett, 1988; Pajares, 1996), the term "cognition" primarily refers to beliefs, attitudes and thoughts that drivers have about the driving environment, and the term "cognitive processes" denotes attributions and appraisals that guide driver's perceptions of on-road events. Finally, the term "situational factors" is broadly applied to denote any temporary or state factor that may affect how on-road events are perceived and appraised (e.g., work stress). Nevertheless, it must be noted that while situational factors play an undeniably important role in driver aggression, they will not be a

primary focus in the current research. Instead, given that cognition will determine what situations a person will attend to and how it will be interpreted, the research will focus on exploring the cognitive factors that have received little attention in the literature.

Finally, Chapter 2 will conclude by describing the proposed model of driver aggression that the program of research will investigate and refine. This model is cyclical in nature to capture the potential for events between drivers to escalate. However, the cyclical nature will not be directly investigated in the program of research. Instead, the research will focus on the perspective offered by one driver rather than consider the perspective of both drivers in an interaction. Interactions between drivers were considered beyond the scope of the current research in light of methodological and practical considerations: while it would have been possible to explore interactions between two drivers using a simulated driving environment, it would have been at the expense of realism. Further, using a simulated driving environment would be likely to increase the potential for social desirability stemming from the physical presence of both another participant, and the researcher running the study, to bias responses. As such, the program of research focuses on addressing gaps in knowledge pertaining to specific components of the proposed model using methods designed to augment the external validity of the findings. Nonetheless, although the cyclical aspect of the model is not being directly explored, the program of research will consider any findings that emerge that may elucidate the cognitive processes involved in escalation.

1.8. Thesis overview

Chapter Two provides a comprehensive overview of the driver aggression literature, including the definition of the construct adopted in the present research. It reviews research investigating psychological factors contributing to driver aggression as well as outlining existing theories that have been propose to explain it. To contextualise the theoretical basis guiding the current research, Chapter 2 also reviews psychological approaches to human aggression research.

Chapter Three reports on the first study of the program of research: a large scale, qualitative study that contextualises the model by examining the scope and type of cognitions associated with driver aggression. Chapter Four presents the results of the second study in the program of research: qualitative interviews

conducted a small sample of drivers participating in the first study. The second study aimed to provide a deeper and enriched understanding of the cognitions associated with driver aggression to inform development of the model. Chapter Five documents the final study of the research program, which conducted a preliminary investigation of key constructs of the proposed model, to examine its efficacy in explaining aggressive driving behaviour. Finally, Chapter Six integrates the findings from the studies, summarising and analysing their relevance with respect to the research questions and discussing strengths and limitations while providing directions for future research.

1.9. Summary

The preceding chapter has provided an introduction to the program of research, by presenting the rationale underpinning it. The chapter has highlighted the importance of understanding the role of cognitions and cognitive processes involved in driver aggression and the highlighted to potential for the GAM to inform the development of a holistic model for understanding driver aggression. The following chapter will provide a review the current body of driver aggression literature in order to contextualise the current program of research.

Chapter 2: Aggressive Driving Literature Review

2.1. Introductory comments

The following chapter provides the empirical context for the program of research, providing a detailed account of the current state of driver aggression literature and the issues that surround it. Driver aggression has been linked to increased crash risk, but the underlying causes of the phenomenon are not well understood. The forthcoming chapter examines existing theories of driver aggression as they relate to the proposed model, and examines the existing empirical evidence for factors that are hypothesised to contribute to driver aggression. In doing so, the review highlights the complexities and difficulties surrounding driver aggression research, which reinforces why driver aggression is currently not well understood.

In order to contextualise the rationale for the research, the review will first consider research and theories from mainstream psychology relating to human aggression. This review will cover the debate concerning how aggression may be defined in a meaningful way, arguments regarding different manifestations of aggressive behaviour, as well as determinants and psychological theories of human aggression. Subsequently, an overview of the issues surrounding driver aggression research and estimated prevalence of the behaviour will be provided, followed by an examination of research pertaining to factors believed to contribute to the behaviour. Finally, current theoretical frameworks for conceptualising driver aggression will be examined, before concluding with a summary of the research, the aims of the program of research, and the research questions.

2.2. General human aggression

Prominent aggression researchers note that by virtue of the abundance of stories concerning violence and aggression in the media, it is unsurprising that many people believe that aggression is omnipresent (e.g., Anderson & Bushman, 2002; Anderson & Carnagey, 2014; Bandura, 1977; Baron & Richardson, 1994; Geen, 2001). A quick scan of the news headlines on any given day is likely to include reports ranging from terrorism, alcohol-fuelled aggression, school and workplace bullying or slanderous taunts between politicians. Given that aggression can have devastating consequences, and in extreme cases, result in death and serious injury, considerable research has been dedicated to understanding its causes and

contributing factors with a view to reducing it. Much of this research offers the potential to enrich understanding of aggression in the driving context.

2.2.1. Defining human aggression

Before defining aggression, the distinction between anger and aggression needs to be demarcated: anger is an internal feeling state typically associated with motivation to hurt others, whereas aggression pertains to the actual act of hurting others (Buss, 1961; Dodge & Coie, 1987; Feshbach, 1990).

A pragmatic and meaningful psychological definition of aggression eluded early research and was surrounded by considerable debate (Baron & Richardson, 1994; Geen, 2001). Early views proposed by Buss (1961) and Dollard et al. (1939) were heavily influenced by the behaviourist perspectives that were dominant at the time, and suggested that any behaviour that physically harms or injures another person, or attempts to do so can be conceptualised as aggressive. Noting that defining aggression in terms of physical behaviour that causes harm would see instances where harm was inflicted accidently be regarded as aggressive, focus shifted towards the underlying motivations for the behaviour as the crucial element in defining aggression (Berkowitz, 1981; Feshbach, 1970). Accordingly, aggression came to be defined as any behaviour motivated by the goal of harming another individual, thus drawing attention to the meaning the person performing the behaviour attaches to it, rather than focusing solely on harm as the outcome. Such suggestions were met with concern from behavioural scholars, who emphasised that motivations and intentions are private and cannot be readily observed, making them difficult to measure experimentally and requiring them to be inferred or self-reported (Bandura, 1983; Buss, 1971; Tedeschi, Smith, & Brown, 1974).

Recent approaches to defining aggression in psychology have evolved to also consider the importance of negative emotions in defining aggressive behaviour, arguing that aggression should stem from negative emotions and should be associated with negative consequences, such that the intended victim should consider it aversive (Zillmann, 1979). Therefore, a widely accepted definition in the current literature is that aggression is "behaviour directed towards the goal of harming or injuring another living being who is motivated to avoid such treatment" (Baron & Richardson, 1994, p. 7). Briefly, it is important to note the distinction between aggression and violence, with violence conceived of as an extreme and particularly

destructive form of aggression (Shaver & Mikulincer, 2011). Thus aggression is best conceptualised as a continuum of behaviours ranging in severity, with violence representing the extreme end of an aggression continuum (Anderson & Bushman, 2002; Baron & Richardson, 1994; Shaver & Mikulincer, 2011).

2.2.2. Types of aggression

Aggression research has historically distinguished between two types of aggression characterised by their antecedents and goals: instrumental and hostile aggression (Berkowitz, 1993; Buss, 1961; Dodge & Coie, 1987; Feshbach, 1970). Hostile aggression, also referred to as reactive aggression, is regarded as spontaneous and thoughtless aggression, performed as a defensive response to a provocation, and driven by the primary goal of harming the intended victim. Little and colleagues (2003) note that conceptualisations of hostile aggression appear to be informed by the frustration-aggression hypothesis (Dollard et al., 1939) where aggressive behaviour is thought to result when an individual's personal tolerance for frustration is exceeded (see section 2.2.4.1). Alternatively, instrumental aggression is conceived of as conscious, premeditated and self-serving behaviour motivated by attainment of a goal other than inflicting harm, and appears to be influenced by principles captured in social learning theories (SLT; Bandura, 1977; Little et al., 2003). SLT considers aggression a learnt behaviour, which thus requires conscious consideration or thoughtfulness (see section 2.2.4.3).

In the recent past, renowned aggression researchers Bushman and Anderson (2001) challenged the notion of classifying aggression according to the hostile-instrumental dichotomy, arguing that it is a dated descriptor of human aggression and that it offers limited potential for understanding aggression when considered alongside current understandings in social cognition. These authors highlight two fundamental flaws underscoring the hostile-instrumental dichotomy which present some internal contradictions, as are outlined next.

First, conceptualising aggression in terms of a hostile-instrumental distinction conflicts with different types of information processing. Cognitive psychologists differentiate between automatic and controlled information processing. Controlled processing is effortful, requiring conscious attention to and awareness of the processing, whereas automatic processing is considered autonomous, quick and efficient, requiring little conscious guidance or attention (Berkowitz, 1981;

Huesmann, 1986, 1998; Wegner & Bargh, 1998; Zillmann, 1983). Thus theoretically, hostile aggression is analogous to automatic information processing while instrumental aggression is a controlled process (Bushman & Anderson, 2001). However, unlike the hostile-instrumental distinction, cognitive paradigms recognise that automatic processing is not the antithesis of controlled processing but rather, they are extremities along a processing continuum (Wegner & Bargh, 1998). Bushman and Anderson highlight that for information processing theories, which are well-regarded in the scientific community, to be consistent with the hostile-instrumental distinction, all instrumental aggression must be controlled and all hostile aggression must be automatic. In reality however, hostile aggression can have controlled features, and instrumental aggression can have automatic features. To that end, the second limitation of the hostile-instrumental approach that Bushman and Anderson (2001) highlight draws attention to the limited capacity for it to account for behaviour with multiple or evolving motives.

Aggressive behaviour is seldom driven by a single motive, but rather influenced by various interacting motives. Similar motives can manifest in different behaviours, just as the same behaviour can be driven by various motives (Geen, 2001). Adopting the examples used by Bushman and Anderson (2001) to illustrate, consider a situation where a man has experienced a threat to his masculinity while surrounded by his peers. He may respond by demonstrating his masculinity through punching the offender, making his response ostensibly hostile. Alternatively, he could delay responding and plan a more vengeful aggressive behaviour designed to humiliate the offender, making the response instrumental. In either case, the act is driven by the same motive: demonstrating and restoring masculinity in response to an insult. Likewise, imagine two siblings who engage in a fight over ownership of a toy, where one sibling pushes the other over. The aggressor sibling could have been driven by the desire to harm the other sibling, making the behaviour hostile, or they could have pushed the other sibling over to get the toy, an instrumental goal. Similarly, in the driving context, a driver may tailgate with instrumental motivations to communicate to another driver that they are blocking their progress and need to move out of the way, or with hostile intent to intimidate and scare the offending motorist. In addition, they could tailgate to both threaten and to signal to move over, thus having multiple motives. Alternatively, similar motives may have different behavioural manifestations: a driver wishing to threaten and intimate another

motorist may do so by tailgating, as in the above example, or they may do so by using a long honk of the horn. Regardless of the behaviour, the motivation is the same: to intimidate another driver. In addition, the hostile-instrumental relationship does not appear to consider the role of rehearsal, such that behaviours that once involved substantial cognition and information processing become automatic and ostensibly hostile through frequent activation. For instance, a driver may tailgate slow drivers to signal to them to increase their speed. After doing this repeatedly, the behaviour (tailgating) becomes more automated and in some instances, may be done without conscious awareness.

Rather than seeking to demarcate various different types of aggressive behaviour, Bushman and Anderson advocate adopting a knowledge structures approach, which does not distinguish between different types of aggression. As will be discussed in section 2.2.4.2, knowledge structures such as schemas, denote the organised ways that fragments of interconnected information are collected and saved in memory (Huesmann, 1998). Knowledge structures are believed to develop when related groups of information in memory are repeatedly activated, serving to increase the strength of the connections such that over time, activation of one part of the concept automatically activates the rest. A knowledge structure does not distinguish between different types of aggressive behaviour, but instead, considers the behaviour in terms of the connectedness of information and the level of rehearsal and activation these connected structures receive.

Multiple motives for the one behaviour fit well within a knowledge structure approach, which considers differing motives as separate elements of the one overarching structure. The arguments Anderson and Bushman's present in their paper are reflected in their general aggression model, which is described in section 2.2.4.5. The GAM heavily emphasises the role of such knowledge structures to capture how they interact with dispositional and situational characteristics to guide interpretation and perception of aggressive stimuli.

2.2.3. Risk factors and determinants of aggression

Aggression is a complex behavioural phenomenon, influenced by a multitude of interacting biological, psychosocial and developmental factors (Heppner et al., 2008). Although no-one is immune from experiencing at least minor or sporadic episodes of anger, some individuals have a stronger predisposition to respond with

aggression when faced with an anger-provoking event. Identifying the determinants of aggression that distinguish such individuals has been the focus of an extensive body of research. To adequately review the empirical evidence concerning the extensive range of factors that have been investigated for their potential role in promoting aggression is beyond the current scope of the research. In keeping with the emphasis on the psychological factors fundamental to driver aggression in the present research, the review will focus on factors considered germane to exploring aggression in the driving context. To begin, however, the review will consider gender differences in aggression, as well as key person-related factors that may be involved in driver aggression.

2.2.3.1. Gender

Gender differences in aggression are well documented, with results showing that males are more likely than females to display overt aggression (Archer, 2004; Baron & Richardson, 1994; Eagly, 2013; Eagly & Steffen, 1986). Although this research is quite extensive and appears to point towards the conclusion that males are the more aggressive gender, the findings should be interpreted with caution as the foundation of these differences is unknown. Some arguments posit that greater aggression in males can be explained by genetic factors (Maccoby & Jacklin, 1980; Tieger, 1980). While empirically demonstrating support for this argument presents an array of challenges, research showing that heightened levels of testosterone in males who display higher levels of aggression does lend some support to the theory (Berman, Gladue, & Taylor, 1993; Book, Starzyk, & Quinsey, 2001; Olweus, 1986). Other perspectives have adopted an evolutionary approach, arguing that the tendency for males to exhibit greater levels of aggression than females may be explained by the greater reproductive competition that males face relative to females. In particular, this approach would suggest that males have learnt to behave aggressively to assert their dominance and gain the attention of females (Archer, 1996; Griskevicius et al., 2009; Wilson & Daly, 1998).

Alternatively, other perspectives argue that heightened male aggression reflects the adoption of stereotypical gender roles, where men are considered tougher and more aggressive than women (Archer, 2004; Eagly, 2013; Eagly & Steffen, 1986; Eagly & Wood, 1991). Reflecting this argument, studies have shown that males report less apprehension and guilt surrounding engaging in aggressive

behaviour than do females, who report experiencing concern over personal consequences to their own safety from aggressive retaliation to provocation (Eagly & Steffen, 1986).

Further supporting the gender role perspective on aggression, research indicates that women and girls are more likely to employ indirect forms of aggression that are difficult to measure. Female gender roles tend to dictate that direct aggression, particularly physical violence is unacceptable behaviour for women (Eagly & Steffen, 1986). This is reflected empirically, with women found to show lower levels of direct aggression, particularly physical violence (Berman et al., 1993; Björkqvist, Lagerspetz, & Kaukiainen, 1992; Lagerspetz, Björkqvist, & Peltonen, 1988). Instead, numerous studies and meta-analyses indicate that women are more inclined to utilise more manipulative forms of aggression, such as gossip and rumour spreading from adolescence through to adulthood (Archer, 2004; Björkqvist et al., 1992; Hess & Hagen, 2006; Lagerspetz et al., 1988; McAndrew, 2014). As research has typically focused on direct aggression, female aggression may thus be under-reported in the scientific literature.

Considered collectively, the findings suggest that the higher rate of aggression observed in males may not reflect an innate underlying tendency of males towards aggression, but instead reflects gender role differences and methodological difficulties in investigating implicit aggression.

2.2.3.2. Anger

Given that aggression is considered to be the behavioural expression of anger, early research was dedicated to empirically documenting the relationship between aggressive behaviour and a trait disposition towards anger. Current understandings consider trait anger as a multifaceted construct, consisting of physiological, cognitive, behavioural and emotional components (Bowman & Conger, 1996; Eckhardt, Norlander, & Deffenbacher, 2004). While state anger refers to the temporary state of experiencing anger, trait anger denotes enduring differences in an individual's propensity to experience frequent, longer and intense episodes of anger (Spielberger, Jacobs, Russell, & Crane, 1983a). As may be expected, evidence indicates a robust positive relationship between trait anger and aggressive behaviour in a range of settings including aggression in the workplace, domestic violence and child abuse (Baron & Richardson, 1994; Geen, 2001; Nix et al., 1999).

2.2.3.3 Hostility

The way events in our environment are perceived is a key determinant of any subsequent aggressive behaviour, with research suggesting that stimuli that provoke aggression are often interpreted as hostile. Hostility describes a predisposition towards negative beliefs and attitudes about others and is associated with cynicism, distrust and vilification (Buss & Durkee, 1957). When behaviour is perceived to be motivated by malicious or hostile intent, aggressive retaliation is more likely than when intention is considered to be innocent or ambiguous (Baumeister, Stillwell, & Wotman, 1990; Bettencourt, Talley, Benjamin, & Valentine, 2006; Deffenbacher, 1992; Wilkowski & Robinson, 2008).

DeWall, Twenge, Gitter, and Baumeister (2009) hypothesised that social rejection cues hostile cognitions and promotes appraisal of events in one's environment as threatening, which then fosters aggression. Supporting this, participants assigned to a social rejection condition displayed greater hostile thinking than those in control or inclusion conditions and further, hostility predicted aggressive behaviour directed towards a confederate that was not involved in the initial exclusion, and partially mediated the link between rejection and aggression. This is consistent with recent studies by DeWall, Buckner, Lambert, Cohen, and Fincham (2010) and Reijntjes et al. (2011) which showed that perceiving hostile intent on the part of the rejecter mediated the relationship between rejection and aggression.

A disposition towards hostility has been found to affect attributions for behaviour. Accordingly, researchers refer a hostile attribution bias (Dodge & Coie, 1987; Nasby, Hayden, & DePaulo, 1980). Accumulating evidence demonstrates that hostile attribution biases are robust and have a strong positive relationship with aggressive behaviour. In a seminal study, Dodge and Coie (1987) varied the level of intentionality from deliberate to benign in a video shown to male children that depicted a confederate child knocking over another child's building blocks. Students identified as highly aggressive by their teacher prior to the study were found to perceive the child's act as hostile, regardless of whether the intent was ambiguous, innocuous or hostile. A meta-analysis of forty-one studies examining hostile attribution biases and aggressive behaviour in children concluded that the effect was robust (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Moderators of this relationship were identified such that significantly larger effect sizes were found

in studies where participants were exclusively male, where more extreme aggressive behaviour and social rejection were specified as selection criteria, in children aged 8-12 and where the stimulus was a staged interaction.

Evidence that hostility reflects an enduring personality trait can be discerned from longitudinal research. Barefoot, Dodge, Peterson, Dahlstrom, and Williams (1989) showed that hostile attribution biases measured in a sample of 585 children approaching completion of preschool significantly predicted aggressive acts observed during kindergarten the following year. When known correlates of aggressive behaviour such as gender and previous exposure to aggression were controlled for in a later follow up, perceptions of hostile intent still remained a significant predictor of aggressive behaviour, right through until the study's completion when the children finished the fourth grade (Dodge, Bates, & Pettit, 1990; Ellis, Essex, & Boyce, 2005).

Dodge (2006) suggests that hostile attributions begin in childhood to serve an evolutionary purpose, helping the child to recognise and protect against threat. These become maladaptive when poor socialisation interacts with biological dispositions to reinforce hostile cognitions, forming a schema. Consistent with this, Ellis et al. (2005) studied 249 children experiencing stressful events in early childhood and found that later in life, they were more reactive to stimuli that they perceived as threatening.

Support for the influence of hostility on aggression can also be derived from studies conducted in adult offender populations (Barefoot et al., 1989; Epps & Kendall, 1995). Using offender samples, Dodge, Price, Bachorowski, and Newman (1990) and Slaby and Guerra (1988) showed that perceptions of hostile intent significantly predicted an offender having committed a greater number of violent crimes, indicating that the effect is evident even in extreme cases of aggressive behaviour. Nix et al. (1999) and MacBrayer, Milich, and Hundley (2003) found that mothers displaying hostile attribution biases reported significantly more aggression towards others, including their own children, and that this bias predicted the use of stern discipline with their children. These findings also lend support to suggestions of a developmental basis for hostile attributions, indicating a cyclical pattern of hostility: mothers model hostile thinking pattern and expose their children to stressful events early in life, promoting the development of the child's own hostile attributional style.

2.2.3.4. Rumination

A third potential determinant of aggression relevant to the current program of research is anger rumination (Borders, Earleywine, & Archana, 2010; Caprara, 1986; Sukhodolsky, Golub, & Cromwell, 2001). Anger rumination refers to a tendency to deliberate over angry moods, focus on past anger experiences, and consider the causes and consequences of anger episodes (Borders et al., 2010; Sukhodolsky et al., 2001).

Rumination has roots in the Freudian notion of catharsis. Catharsis posits that repressing negative emotions is detrimental to ones' psyche and that emotions should be purged to maintain a positive state of mind (Breur & Freud, c.1900; cited in Bushman, 2002). Although the notion of catharsis appears to permeate modern society, with popular culture encouraging "blowing off steam" and refraining from bottling up emotions, empirical evidence supporting its efficacy in maintaining a positive state of mind is lacking. Hornberger (1959) found that participants who were provided with the opportunity to insult a confederate who had earlier criticised them were harsher when given the chance to vent their negative responses through hammering nails. A review by Geen and Quanty (1977) concluded that venting promotes aggression rather than extinguishes it, noting that catharsis is only effective when expressed directly to the antagonist, and when the aggressor believes that the target of the aggression will not retaliate.

Bushman (2002) maintains that rumination is essentially an internal catharsis: it is a means of internally processing an anger experience. Hypothesising that rumination spurs aggression, just as catharsis does, Bushman allocated participants to a rumination condition where they were instructed to hit a punching bag while thinking about a confederate who had angered them earlier, or to a distraction condition where thoughts of fitness were encouraged while punching the bag. Consistent with the predictions, ruminating participants reported greater levels of anger after punching and greater subsequent aggression towards the provocateur, operationalised by sounding a loud horn.

Bushman's (2002) findings mirror extensive literature indicating that rumination intensifies anger and promotes aggression, and that a predisposition toward rumination correlates positively with related constructs such as trait anger and aggression (Caprara, 1986; Denson, Pedersen, & Miller, 2006; Rusting & Nolen-Hoeksema, 1998; Sukhodolsky et al., 2001). Collins and Bell (1997) found that after

receiving negative feedback on task performance, participants with a strong disposition towards anger rumination, as measured by the Anger Rumination Scale (Sukhodolsky et al., 2001) adopted the most aggressive option provided to them to defeat the confederate providing the negative feedback on a subsequent task more often than low ruminators did. Similarly, Bushman and colleagues (2005) gave participants negative feedback on a task and then assigned them to either a rumination condition where they were induced to ruminate or a distraction condition. Participants who ruminated displayed greater aggression both in response to an unrelated minor provocation presented after the rumination and one presented twenty minutes following the initial negative feedback, suggesting that rumination can increase displaced aggression. Further, the effect was stronger for participants in the rumination condition who reported greater levels of anger in response to the initial event.

Anestis, Anestis, Selby, and Joiner (2009) controlled for known correlates of aggressive behaviour such as impulsivity, gender and tendency towards symptoms of depression and anxiety, and found that anger rumination remained a significant predictor of physical and verbal aggression and hostility. Contrary to predictions, rumination did not predict anger, suggesting that while rumination may temporarily increase anger, other factors must combine with rumination to result in the persistent increases in anger which then fuels rumination. Supporting this relationship, Mathieson, Klimes-Dougan, and Crick (2014) argue that rumination functions to fuel negative emotions by either exacerbating existing negative emotions through rehearsal, or by interacting with other risk factors. In light of robust evidence demonstrating that hostility increases aggression, it has been proposed that a disposition towards rumination fuels aggression by enhancing attention towards one's own hostile thought, thereby exacerbating them (Bushman, 2002; Wilkowski & Robinson, 2008, 2010). However, evidence suggests that rumination can be inhibited by mindfulness, which represents the final construct of interest to the present research (Borders et al., 2010; Kelley & Lambert, 2012; Shonin, Van Gordon, Slade, & Griffiths, 2013).

2.2.3.5. Mindfulness

Mindfulness is defined as moment to moment awareness or purposefully paying attention to the present moment, and can represent an enduring dispositional

characteristic (Kabat-Zinn, 1990, 2003). Mindful people consciously focus on present sensations in a non-judgmental and accepting manner, diverting their attention away from past or future concerns or anxieties to the present (Baer, 2003; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). They acknowledge their thoughts, but allow them to flow without becoming attached to them or considering them as threats to self-esteem (Heppner et al., 2008; Shonin et al., 2013; Wright, Day, & Howells, 2009). There is accumulating evidence that mindfulness decreases anger and aggression. For instance, Shonin et al. (2013) found that trait mindfulness correlated with lower self-reported aggression and hostile attribution bias in a sample of undergraduates. Similarly, Heppner et al. (2008) demonstrated that those completing a mindfulness activity to induce a mindful state prior to receiving negative feedback were less aggressive when given an opportunity to retaliate later. This was recently replicated by Kelley and Lambert (2012) to show that the positive effect of mindfulness in reducing anger, hostility and aggression is evident in populations of incarcerated inmates.

Kelley and Lambert (2012) propose that mindfulness inhibits aggression by disrupting ruminative tendencies and promoting a decentralised acceptance of one's emotions and cognitions; a perspective consistent with earlier arguments proposed by Teasdale (1999). Empirically supporting this, Borders et al. (2010) employed structural equation modelling to show that rumination partially mediated a causal link between mindfulness and hostility, anger and aggression, providing evidence to support suggestions that mindfulness works to reduce aggression by thwarting rumination.

In summary, dispositional hostility and rumination appear to be determinants of aggression, potentially because rumination encourages focusing on ones' own hostile thoughts, thus augmenting them, as shown in studies where rumination has been induced via experimental manipulation. However, evidence from studies where mindfulness has been induced suggest that mindfulness can reduce aggression, by thwarting anger rumination, and thus represents a potential factor that may protect against driver aggression.

Other research exploring determinants of aggression have explored social and interpersonal antecedents of aggression such as frustration, social rejection and threats to ego (Baron & Richardson, 1994; Baumeister et al., 1990; Geen, 2001; Twenge & Campbell, 2003). This research will now be described.

2.2.3.2. Social and interpersonal factors

One of the earliest and perhaps the most widely investigated triggers of aggression was frustration (Baron & Richardson, 1994; Dollard et al., 1939). Frustration refers to a negative emotional state experienced in response to having one's goals impeded or blocked (Dollard et al., 1939; Geen, 2001). It was theorised that aggression results when one's personal tolerance for frustration is exceeded. Interest in the role of frustration in motivating aggression can be attributed to the frustration-aggression hypothesis, which asserts that frustration results in aggression (see section 2.2.4.1). Although the idea that aggression results from frustration is intuitive and parsimonious, empirical evidence supporting it is lacking (Bandura, 1977; Baron & Richardson, 1994; Geen, 2001). Studies that have found support for frustration leading to aggression show weak effects and some studies contain serious methodological confounds. Most importantly, the hypothesis contains many flaws that are also documented in section 2.2.4.1. Accordingly, while it is accepted that frustration certainly plays a role in increasing aggression, other factors need to be considered when studying provocation as a determinant of aggression (Geen, 2001). Two types of provocation, ego threat and social rejection have dominated much of the research, and are examined next.

A wide body of literature exists indicating that ego threat provides some impetus for aggressive behaviour in individuals possessing an inflated self-concept (Averill, 1983; Baumeister, Smart, & Boden, 1996; Baumeister et al., 1990; Konrath, Bushman, & Campbell, 2006).When egotistic individuals perceive that their self-concept has been denigrated, ridiculed, questioned or opposed, aggression is used to restore it and reprimand those who insulted it (Baumeister, Bushman, & Campbell, 2000; Baumeister et al., 1996; Bushman et al., 2009; Twenge & Campbell, 2003). Studies testing this hypothesis typically define egotism in terms of narcissism, which represents an extreme form of the phenomenon, with an over-inflated, grandiose view of the self (Baumeister et al., 2000; Bushman et al., 2009; Konrath et al., 2006). Traditionally using negative feedback to elicit aggression, these studies demonstrate that participants with greater narcissistic traits report greater anger in response to criticism, diffuse responsibility by blaming others, and insult, humiliate and slander others after receiving such feedback (Baumeister et al., 2000; Kernis & Sun, 1994; Rhodewalt & Morf, 1998; Smalley & Stake, 1996). Although negative feedback is the most commonly used means of threatening an individual's ego in experimental

settings (Konrath et al., 2006),other studies have examined the impact of social rejection on provoking aggression in a range of age groups (Bushman, Bonacci, Van Dijk, & Baumeister, 2003).

Baumeister and Leary (1995) posit that a sense of belonging is a basic human need which motivates people to maintain social bonds. Experiencing exclusion or rejection in social settings therefore threatens a basic human need, devalues self-concept, promotes negative emotions including jealousy and anger and is said to elicit aggression to restore self-image (Baumeister & Leary, 1995; DeWall & Bushman, 2011; Kernis, Cornell, Sun, Berry, & Harlow, 1993; Kernis, Lakey, & Heppner, 2008). This effect is said to be accentuated in people for whom the self-concept is dependent on being well-liked by others and where there is unstable self-esteem (Fein & Spencer, 1997; Feshbach, 1970).

Supporting this theory, empirical findings document a strong, positive association between social rejection and aggressive behaviour (DeWall et al., 2010; DeWall et al., 2009; Leary, Twenge, & Quinlivan, 2006; Twenge, Baumeister, Tice, & Stucke, 2001; Twenge & Campbell, 2003).This has been demonstrated in experimental settings where ostensibly minor or innocuous forms of social exclusion are employed to operationalise rejection (Gonsalkorale & Williams, 2007; Leary et al., 2006; Twenge et al., 2001; Twenge & Campbell, 2003) and in correlational studies demonstrating an association between social rejection and aggression that extends through to extreme, violent forms of aggression. Studies such as these have shown that that offenders who have committed extremely violent acts such as mass shootings cite rejection-based triggers for their crimes: job loss, relationship breakdown and/or rejection by family (Meloy et al., 2004; Twenge et al., 2001). Additionally, the effect has been documented in children; children with fewer friends have been found to display greater levels of aggression towards their classmates (Newcomb, Bukowski, & Pattee, 1993; Twenge et al., 2001). However, it must be recognised that the direction of this relationship is unclear, and it is possible that children may reject aggressive peers.

Given that the use of aggression, which is arguably, an undesirable behaviour to restore image upon experiencing social rejection seems somewhat counterintuitive, much research has been dedicated to investigating the underlying mechanisms that promote aggression following social rejection. Early investigations focused on examining the role of emotional distress in mediating the relationship

between rejection and aggression, proposing that social rejection increases negative emotions that give rise to emotional distress (Twenge et al., 2001). However, evidence has led to this theory being largely abandoned, with many studies unable to demonstrate that negative emotions increases following social rejection, or that emotion mediates the association with aggression (Baumeister, Twenge, & Nuss, 2002; Twenge & Campbell, 2003; Twenge, Catanese, & Baumeister, 2002; Zadro, Williams, & Richardson, 2004). In fact, a handful of studies have found that pain and negative emotion were absent in socially rejected individuals who behaved aggressively, suggesting that rejection mutes the experience of negative emotions (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Baumeister et al., 1990; Borders et al., 2010; Stillman et al., 2009).

2.2.4. Psychological theories of general human aggression

Theories seeking to account for aggressive behaviour are prevalent in the general aggression literature. Although it is acknowledged that many of these theories adopt a biological perspective, in keeping with the scope of the research outlined in Chapter 1, such theories will not be reviewed (see Shaver & Mikulincer, 2011for a review). Rather, supporting the research's aim of informing the development of a model for understanding driver aggression, the review will consider psychological theoretical perspectives of aggression. These theories can be grouped into two broad overarching categories: social cognition or social information processing theories, and social learning theories. Before discussing these theories, the review will consider what is regarded as the original theory of human aggression, the frustration-aggression hypothesis.

2.2.4.1. The frustration-aggression hypothesis

Frustration broadly refers to the impediment or obstruction of personal goals (Dollard et al., 1939; Geen, 2001). Baron and Richardson (1994) note that the idea that frustration gives impetus to aggression is so widespread that it is considered factual by the general population. The frustration-aggression hypothesis, which underlies this assumption, contains two central premises (Dollard et al., 1939). Firstly, the hypothesis proposes that experiencing frustration always results in aggression; secondly, that aggression is always the result of frustration. Although the theory is attractive owing to its intuitive appeal, evidence supporting these relationships is lacking (Bandura, 1973; Baron & Richardson, 1994).

The contention that aggressive behaviour is always caused by frustration would appear too sweeping in scope, with research demonstrating many antecedents for aggression, including provocation such as rejection or threatened ego, as well as aversive stimulus (Baumeister et al., 2005; Berkowitz, 1981, 1989; Zillmann, Johnson, & Day, 1974). Likewise, suggestions that aggression is always a reaction to frustration are also too simplistic. Frustration represents one of many reactions experienced in response to obstruction of goals (Baron & Richardson, 1994; Geen & O'Neal, 1969; Krahé, 2013). Some people may experience sadness when goals are blocked, others may experience resignation and others may become withdrawn. Moreover, the same person may produce different reactions in response to thwarted goals depending on the situation in which the frustration occurs. This raises another key flaw in the hypothesis: even if one experiences frustration and feels compelled to behave aggressively, if the situation does not permit aggression, or the risks are too high, aggression is unlikely, suggesting a conscious component to the response (Baron & Richardson, 1994).

To illustrate, consider a university student who requires five additional marks in order to pass a prerequisite course required to qualify for graduation. The student requests to have a piece of assessment reassessed in order to gain the extra marks, but the request is denied. Although this is a situation in which the student's goal (graduation) is blocked, he/she is unlikely to be aggressive towards a university professor, even if holding the professor partly responsible for thwarting the goal. Although the desire to aggress may be present, the consequences associated with aggression towards a university staff member would likely be considered too severe. Circumstances such as these can result in aggression being directed towards an innocent other in place of aggression against the source of frustration, a phenomenon called displaced aggression (Miller, 1948; Miller, Pedersen, Earleywine, & Pollock, 2003). In sum, although it is accepted that frustration plays a role in aggression, the suggestion that it is the primary driving force for aggression is too simplistic as an explanation for a complex behaviour like aggression.

Many factors interact to influence whether a provocation results in aggression, and the frustration-aggression hypothesis does not adequately capture such interactions or processes that mediate the relationship between stimulus and response (Pashler, 1999; Sanders, 1998). As such, more recent theories emphasise

the role of cognitive processing and appraisal, as well as the impact of social learning (Bargh & Ferguson, 2000).

2.2.4.2. Social cognition

Social cognition examines how social information is processed to make sense of the social world, drawing on concepts from cognitive psychology to do so. Cognitive psychology defines cognition as the psychological processes involved in attaining knowledge and includes processes such as perception, thinking, memory and problem solving (Huesmann, 1998; Wegner & Bargh, 1998). Cognition is said to mediate the relationship between a stimulus and a behavioural response to it (Wilkowski & Robinson, 2008).Thus social cognition is concerned with the psychological processes involved in perceiving, interpreting, analysing and remembering information about the social world (Moskowitz, 2005).

Social cognition (also referred to as social information processing) is aided by cognitive frameworks referred to as schemas, which are knowledge structures that represent information about related cognitions, including beliefs, attitudes and thoughts about a particular concept or stimulus. It contains information about its attributes and the relationship among those attributes (Fiske & Taylor, 2013). Schemas influence social cognition by providing a practical and convenient framework to organise, interpret and make sense of an event in our social environment with limited information and effort. That is, certain signals will activate a schema, which subsequently aids processing by increasing its speed and efficiency; allowing the environment to be processed in predictable ways according to the information and relationships between related concepts stored in the schema (Huesmann, 1998; Neisser, 1967, 1976; Wegner & Bargh, 1998). Schemas can pertain to people, events, roles and behaviours, with behavioural schemas referred to as scripts. Social cognition approaches to aggression share the central premise that how stimuli is cognitively processed by structures such as schemas, is a major determinant of subsequent anger and aggression (Huesmann, 1998; Wilkowski & Robinson, 2008). Three key cognition-based theories of aggression will be described.

2.2.4.2.1. Cognitive Neoassociation Theory. The cognitive neoassociation theory of aggression argues that aggression results when negative affect triggers aggressive thoughts, emotions and behaviours that have been linked together in memory (Berkowitz, 1989, 1990, 1993). Initially proposed as an amendment to the

frustration-aggression hypothesis, Berkowitz suggested that whether goal-blocking events result in aggression is dependent on whether they are interpreted as negative and elicit negative emotions. Further, the cognitive neoassociation perspective extends its scope to incorporate aversive or unpleasant events, as well as aggressive cues as precursors to aggression. Aversive stimuli such as provocation, frustration, or even hot temperature and loud noise are posited as able to generate negative emotions, activating related cognitions stored in memory. These negative emotions then prime related thoughts, emotions and behaviours linked as a schema. Consequently, negative emotions generated by the aversive stimulus trigger negative cognition and reinforce the association of the negative emotion with the triggering event, which is then stored in memory.

2.2.4.2.2. Script Theory .Script theory conceptualises aggressive behaviour as the product of a strongly linked and well-rehearsed script embedded in memory that provides a template demarcating how to behave in response to negative emotions such as anger and frustration (Huesmann, 1988). To recapitulate, a script is a schema about an event or social situation that provides information to assist in defining the event and guiding how to behave in it (Abelson, 1981). For instance, when a person boards an airplane to take a flight, a flight script is activated that contains conventions regarding what is likely to happen on the flight: boarding will be announced by ground staff, passengers will then proceed to board their flight according to row number. Upon entering the aircraft, a flight attendant will direct them to their seat; they will store their carryon luggage in the overhead compartment, take their seat and fasten the seat belt. The captain will introduce themselves and give details of the flight and as the plane is taxiing on the runway, flight attendants will demonstrate the safety features of the aircraft. Thus when an event occurs, a person scans memory to select a script appropriate to the situation and then adopts the role that the selected script demarcates.

Scripts theory draws on social learning theory (see section 2.2.4.3) to posit that scripts are learnt, acquired through an individual's experiences or by observation (Huesmann, 1988). The development of a script, particularly the strength of its association and accessibility in memory is theorised to be influenced by how frequently it is activated and enacted (Bushman & Anderson, 2001; Huesmann, 1988; Huesmann & Guerra, 1997). With repeated activation and frequent use, scripts develop to become more refined and salient in memory, producing additional

pathways to additional concepts such that even complex thought processes can become automated (Stephenson, 2009; Wegner & Bargh, 1998).Thus a frequent flyer will have a stronger "boarding a flight" script than a first time flyer, and will be able to enact the process of boarding a flight with relative automaticity.

The script theory approach to aggression argues that aggressive scripts develop when an individual has been repeatedly exposed to instances of aggressive behaviour and learns to identify aggression as an appropriate response to situations involving negative emotions such as anger, frustration or threat. The more often the aggression script is activated, the more it becomes cemented and salient in memory. Script theory has received support in studies examining aggression and violence in children (Carnagey & Anderson, 2004) and offers an effective explanation for how a complex behaviour such as a aggression can become automated (Anderson & Bushman, 2002).

2.2.4.2.3. Excitation Transfer Theory. Excitation transfer theory (Zillmann, 1983) posits that because physiological arousal dissipates slowly, if arousing events occur in close succession, arousal from the initial triggering event can be misattributed to later events. If the later event evokes feelings labelled as anger, the experience of the emotion will be intensified due to the earlier arousal (Anderson & Bushman, 2002; Zillmann, 1983).

Most notably, the theory offers a strong explanation for displaced aggression, where aggressive behaviour is directed at an innocent target rather than at the original antagonist (Marcus-Newhall, Pedersen, Carlson, & Miller, 2000; Miller et al., 2003). According to excitation transfer theory, displaced aggression is simply misattribution of physiological arousal. Further, the theory offers a unique perspective regarding how arousal from various sources can interact to increase or decrease the likelihood of aggression (Baron & Richardson, 1994; Cotton, 1981; Geen, 2001). Evidence indicates that arousal from various sources such as exercise, scary films and noise can increase aggression in response to a later event (Huesmann, 2007; Zillmann, Bryant, Comisky, & Medoff, 1981; Zillmann et al., 1974), but can also decrease it in circumstances where the arousal is not attributed to a provocation or labelled as negative (Baron & Richardson, 1994; Zillmann, 1983; Zillmann et al., 1974). Thus the theory offers an account of both how the likelihood of aggression is increased, and how it is decreased.

2.2.4.3. Social learning theory

Social learning approaches to aggression argue that the behaviour is learnt exclusively through experience, by either directly encountering aggression, or by observing others engaging in it (Bandura, 1973, 1977; Bandura, Ross, & Ross, 1961). Social learning theories incorporate many of the processes suggested in the previously mentioned social cognition theories, but focuses on how scripts and schemas are acquired; arguing that they are learnt.

The social learning perspective of aggression developed from a seminal study by Bandura et al. (1961) colloquially known as the Bobo Doll study. Seventy-two children were randomly allocated to a control, aggression or non-aggression condition where in the aggression condition, children watched an adult behave aggressively towards a large doll called "Bobo." All children were later placed in a room for 20 minutes and told they could play with the array of toys in it, one of which included a Bobo doll. Their behaviour was observed through one-way mirrors and rated by independent observers for aggressive behaviour. Children in the aggression condition were found to behave more aggressively towards the Bobo doll than children in the control or non-aggression conditions, and further, the aggressive behaviour displayed by the aggressive children were both direct imitations of the adult's original aggressive behaviours and extensions that the adults had not modelled. Bandura and colleagues concluded that aggression can be acquired through observing another person model the behaviour and elaborating the learned behaviours.

The premise that aggression is learnt through experience has received much empirical support, particular concerning how children learn aggressive behaviours. The Bobo doll experiment presented important implications concerning the effects that exposure to violence, particularly through media or video games can have on children. Supporting these concerns, substantial evidence demonstrates that children exposed to aggressive behaviour, including through television or video games display greater aggressive behaviour themselves (Bushman & Anderson, 2002; Bushman & Geen, 1990; Schaefer & Mattei, 2005; Sestir & Bartholow, 2010; Yang, Huesmann, & Bushman, 2014). Meta-analyses also support this finding (Anderson et al., 2010; Carnagey & Anderson, 2004; Greitemeyer & Mügge, 2014). As such, it is generally accepted that observational learning partly accounts for the way aggressive behaviour and an understanding of its consequences of it develops.

2.2.4.4. Summary of social learning and social cognition theories

Considered collectively, a number of similarities are evident between social learning and social cognition theories, particularly concerning the mechanisms considered essential to aggression (Howells, 2004). Although each theory presents a unique perspective on aggression, social cognition theories share the assumption that the way provocative stimuli are processed, appraised and interpreted is a fundamental determinant of the response to it (Wilkowski & Robinson, 2008). In particular, stimuli interpreted as negative or hostile increase the likelihood of an aggressive response compared to stimuli appraised as neutral. Thus when considered in isolation, social cognition approaches offer an effective account of the underlying internal processes that lead to an act of aggression; however, they have limited capacity in explaining how the schemas that affect the way stimuli are perceived develop. In contrast, when social learning theory is considered independently, it provides a strong account of how individuals acquire the schemas and scripts that influence the processing of social information, but offers less in the way of explaining the internal processes involved in the perception of stimuli that ultimately determine our behaviour. Therefore, rather than providing competing paradigms, it can be argued that social learning theory complements social cognition theories and that their potential to explain aggression is enhanced when they are combined. Reflecting this, Anderson and Bushman (2002) highlighted that the domain specificity of many theories of aggression limits their explanatory power. In an attempt to redress this, Anderson proposed the general aggression model in order to capture the strongest elements of each specific theory and combine them into a unified, integrative framework for understanding aggression.

2.2.4.5. General Aggression Model (GAM)

The GAM is depicted in Figure 2.1 and illustrates how person-related and situational factors are hypothesised to influence aggression through their influence on the cognitions and emotions they generate. Adopting the knowledge structures approach described earlier (section 2.2.2) by Bushman and Anderson (2001), the GAM explicates how the interaction between trait characteristics and situational factors informs the development of the cognitive structures such as schemas that assist in appraising and processing stimuli as aggressive, and thus warranting a

response, as well as the behavioural responses that may result (Anderson & Bushman, 2002; Heppner et al., 2008).

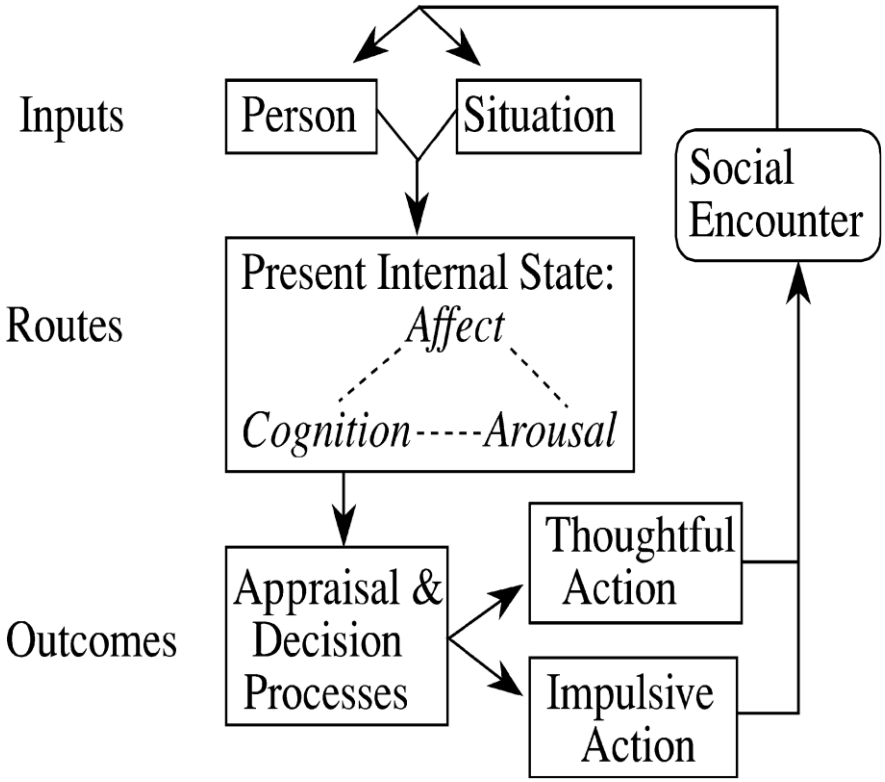

Figure 2.1. The General Aggression Model (Anderson & Bushman, 2002, pg.34).

The GAM posits that aggression is a social encounter, interpreted by a person with their own individual personality traits in a specific context. Person-related factors such as genetics, attitudes, values, scripts and trait characteristics interact with environmental factors such as unpleasant situations, provocation and aggressive cues, which are denoted in the model as inputs. These inputs then generate specific cognitions and feelings which guide the appraisal process through their influence on the individual's present internal state (emotions, physiological arousal and cognitions). The response depends on whether the appraisal was thoughtful or impulsive. An impulsive appraisal is immediate, automatic and spontaneous, occurring without much conscious awareness, whereas a thoughtful appraisal is likely to be more controlled and deliberate, involving the seeking of additional information regarding the event to form a re-appraisal (Anderson & Bushman, 2002).

Anderson and Bushman suggested that uniting the domain-specific theories to form an integrated framework that incorporates the influence of personality, situation and cognition would allow researchers to adopt a more holistic approach to the study

of human aggression. Supporting this argument, the model has been adapted to explain aggression in a diverse range of contexts, including the effect of video-game violence on aggression (Bushman & Anderson, 2002; Chory & Cicchirillo, 2007), homophobic aggression (Parrott, 2008; Parrott, Peterson, & Bakeman, 2011; Prati, 2012), alcohol fuelled aggression (Bushman, Giancola, Parrott, & Roth, 2012), though to aggression and violence at a national or governmental level (DeWall & Anderson, 2011). Thus the model provides a framework to advance understanding of aggressive behaviour in a wide range of contexts.

2.2.4.6. Summary of psychological approaches to theories of general human aggression

The preceding review has provided an overview of relevant research and theoretical perspectives from general human aggression. It highlighted that negative emotions and intention to harm are key elements in determining if a behaviour can be regarded as aggressive, and drew attention to issues with the hostile-instrumental approach to aggression. Furthermore, the review drew attention to some key risk factors and determinants of aggression that have been explored, and described key psychological theories of human aggression. The review will now focus on literature concerning aggression in the driving context.

2.3. Driver aggression

Chapter 1 provided a brief insight into the current state of road safety and the need for novel interventions to reduce the burden associated with road trauma. Despite evidence indicating that anger and aggression while driving increases crash risk and decreases driving performance to a level of impairment comparable to intoxication, driver aggression is not well understood (AAA Foundation for Traffic Safety, 2009; Cai, Lin, & Mourant, 2007; Chliaoutakis et al., 2002; Cook, Knight, & Olson, 2005; King & Parker, 2008). Stack (1956) highlights that traffic collisions are generally considered to be the result of deficiencies in driving- related skills such as visual perception and reaction time. However, Stack argues that the "the real causes of accidents are far more deep-seated. They have to do with our attitudes, our emotions, and our judgments" (pg. 778). Currently, little is known about the psychological processes that guide driving behaviour: the way that drivers think about and interpret on-road events that result in aggression, and the factors that influence these processes. Without an understanding of the underlying motivations

that provide the impetus for aggressive on-road behaviour, effective interventions to reduce it cannot be developed.

Self-report surveys help to highlight the need for insight into the cognitions involved in driver aggression, as they illustrate an interesting contradiction between drivers' beliefs about aggression and their own aggressive behaviour. While 82% of drivers in an Australian survey (Australian Associated Motor Insurers, 2011) indicated that the most appropriate way to handle provocative on-road events is to ignore it, over half of these same motorists admitted to horn-honking, giving rude gestures and tailgating when they encountered provocations. Moreover, 82% stated that they regarded their behaviour as justified, despite it being incongruent with their stated beliefs.

There are a number of theoretical and methodological limitations that have contributed to the lack of understanding of driver aggression. A description of these issues will be provided in order to contextualise the milieu in which the research that will be reviewed in the forthcoming chapter has been conducted.

2.4. Issues and challenges of driver aggression research

2.4.1. Defining driver aggression

Similar to research on general aggression, research examining driver aggression has been hampered by the lack of a universally accepted conceptual definition of the construct (Dula & Geller, 2003; Ellison-Potter, Bell, & Deffenbacher, 2001; Iliescu & Sârbescu, 2013; Richer & Bergeron, 2012; Smart & Mann, 2002b). Substantial disparity exists in the terminology used to refer to driver aggression, with terms such as "aggressive driving", "driver anger" and "driver hostility" all used reciprocally to denote the same construct (Dula & Ballard, 2003; Dula & Geller, 2003). Amplifying the confusion, accounts of driver aggression in the media frequently use the term "road rage" to describe events that involve extreme on-road aggression, tending towards road violence, which has resulted in terms such as road rage and driver aggression being used interchangeably by researchers and laypersons alike to describe many aggressive on-road behaviours, ranging in severity (Asbridge, Smart, & Mann, 2003).

Emulating general aggression research's conceptualisation of aggression and violence as discrete elements of the same construct, the term road-rage should not be applied to extreme, violent behaviours and milder, non-violent behaviours alike

(Elliot, 2000; Smart & Mann, 2002b; Tasca, 2000). Rather, aggressive driving is best considered as occurring on a continuum ranging from milder, non-violent behaviours through to violent, road rage behaviours (Dula & Geller, 2003; Roberts & Indermaur, 2005a). At the extreme end, the term road rage denotes the rare, but severe cases of driver aggression that involve violence on the road, such as assault, bodily harm and even homicide (Dula & Geller, 2003; Ellison-Potter et al., 2001; Richer & Bergeron, 2012). In contrast, the term driver aggression is used to refer to behaviours that fall towards the lower to middle end of the continuum such as tailgating, horn-honking, weaving and profanity. This approach not only distinguishes road violence from aggression, it reflects growing arguments maintaining that although non-violent aggressive driving behaviours are not dangerous in isolation, their danger lies in the potential for these acts to be responded to in a 'tit-for-tat' manner and to escalate into a more serious event (Hennessy & Wiesenthal, 1999; Novaco, 1991; Tasca, 2000).

The absence of a universally accepted definition of driver aggression gives rise to some considerable methodological concerns. First, it has produced substantial variation in the behaviours adopted to operationalise driver aggression. Some definitions (e.g., Mizell, 1997) have focused specifically on violence and injury to operationalise driver aggression, whereas others (e.g., Martinez cited in Shinar, 1998) adopted an expansive definition, that included behaviours ranging from running red lights, through to confronting a motorist with a weapon. As a consequence, estimating the prevalence of driver aggression is problematic, as estimates vary according to how it has been defined and operationalised. Second, in the absence of a theoretical definition of the construct, some studies appear to have embraced a behaviourist perspective by defining driver aggression according to a list of behaviour deemed aggressive (Bochner, 1971; Chase & Mills, 1973; Doob & Gross, 1968; Dula & Geller, 2003; Shinar, 1998; Shinar & Compton, 2004). These studies make the assumption that the observed behaviours reflect underlying aggressive motives; an assumption that presents a crucial flaw. Horn honking can provide an illustration: although honking can be performed with an aggressive intent when used to insult another motorist, it is often used with a helpful intention to alert another driver (e.g., that the lights have changed) and in this context, does not intend any malice towards the target driver. Reflecting this, studies investigating the role of vehicle status on driver aggression by Doob and Gross (1968), Bochner (1971) and Chase and Mills (1973) all yielded contradictory results using horn-honking latency

to operationalise driver aggression, highlighting the importance of considering underlying motivations and intentions for behaviour rather than solely observing it.

Focusing on intentions or motivations for behaviour assists in distinguishing between driving that is risky and that which is aggressive. Ellison-Potter et al. (2001) highlight that many of the behaviours considered aggressive in the literature (e.g., speeding, running stop signs) are not always associated with negative emotions. Some drivers engage in these behaviours because they experience a thrill in doing so. Although these behaviours are unquestionably risky and pose a threat to the safety of other road users, the intention of the motorist performing them, arguably, is not harm others (Richer & Bergeron, 2012). Consistent with this, in testing a measure designed to distinguish risky driving from aggressive driving, Dula and Ballard (2003) found that items assessing risky driving correlated with related personality traits such as impulsivity and sensation-seeking, but did not correlate with measures of anger and hostility, which instead, were associated with items measuring aggressive driving. To that end, issues in distinguishing risky driving from aggressive driving also highlight another problem with defining driver aggression in terms of a list of behaviours considered to be aggressive: the same behaviour (e.g., tailgating) could be conceptualised as either risky or aggressive, depending on the underlying intentions for the behaviour (i.e., tailgating another motorist to intimate the target driver, versus tailgating due to carelessness or inattention). Moreover, the intentions of the behaviour could change throughout the course of the event: what may commence as risky driving when a driver tailgates another motorist because they experience a thrill from driving fast and seeing how closely they can follow, may become aggressive if tailgating driver begins to experience frustration (a negative emotion) at the driver blocking their progress. This is illustrated in Figure 2.2 below.

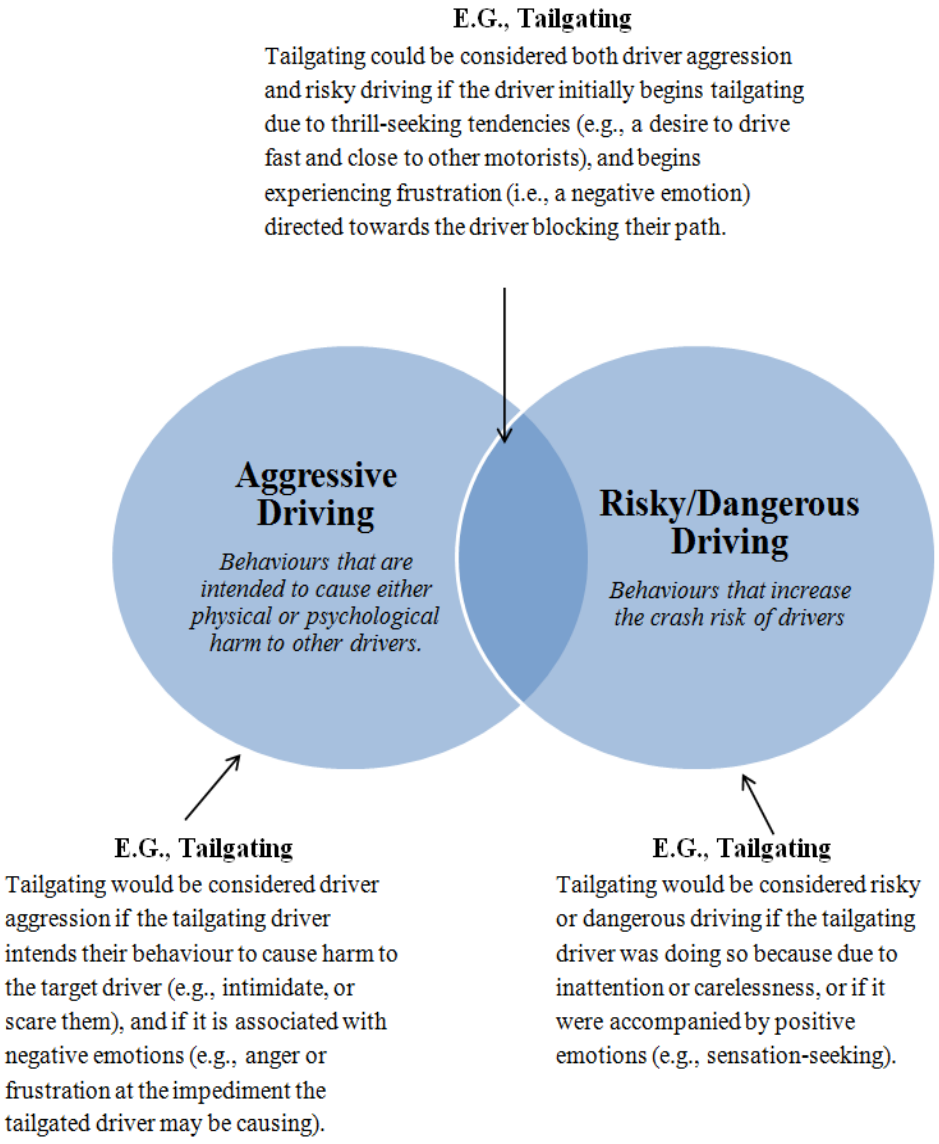

Figure 2.2. The relationship between driver aggression and risky driving

In sum, inconsistency surrounding the definition of driver aggression has thwarted progress towards an understanding of the causes of it (Dula & Geller, 2003). In order to advance current knowledge to a point where it can meaningfully inform interventions to reduce driver aggression, a consistent definition with a solid theoretical underpinning is required to guide a systematic investigation of the phenomenon. It is noted that several parallels exist between the issues surrounding defining driver aggression and those that surrounded defining general aggression (see section 2.2.1). General aggression research now concurs that aggression is most meaningfully conceptualised as a behaviour that occurs along a continuum of severity, with intent to cause harm and underlying negative emotions considered

essential elements in determining if a behaviour can be regarded as aggressive. Focusing on intentions to harm and emotions draws attention to the underlying meaning, or purpose of the behaviour and thus accounts for the cognitive and emotional processes influencing it. Applying this to the driving context, the current program of research therefore defines driver aggression as:

> *'any on-road behaviour adopted by a driver that is intended to cause physical or psychological harm to another road user, and is associated with emotions such as frustration, anger and/or rage'* (Soole et al., 2011, pg.7).

This definition of driver aggression offers a theoretical definition of the construct that mirrors the leading definition adopted in the psychological approach to general aggression. It is anticipated that defining driver aggression by focusing on the underlying emotions and meaning attached to behaviour will assist in bringing uniformity to the research: it should provide researchers a more objective way of determining whether on-road behaviour can be considered aggressive. Furthermore, it is expected that using this definition in the current research will generate knowledge that will be valuable in informing interventions, as it is likely that different underlying motivations for aggressive driving behaviour will require different methods of intervention (Soole, Lennon, Watson, & Bingham, 2011).

It must be noted that in the current program of research, "harm" will be broadly conceptualised, ranging from behaviours that appear to be designed to cause even mild discomfort to the target motorist, extending through to more serious distress such as threat and intimidation. To that end, in keeping with the scope demarcated in Chapter 1, non-violent aggression is not the focus of the program of research.

2.4.2. Victim or perpetrator?

One of the complexities of studying a dynamic phenomenon like driver aggression is the tendency to focus on the victims' perspective when in reality; the distinction between the two roles is not always straightforward (Asbridge et al., 2003; Dula & Geller, 2003; VCCAV, 1999). To illustrate, tailgating is frequently considered to be an aggressive behaviour by many drivers, regardless of the intent of the perpetrator (the tailgater). The tailgater may simply be inattentive or not realise they are following too closely. However, if the driver being tailgated (i.e., the

"victim") interprets the tailgating as deliberate and intended to be harmful, that is, aggressive, and responds in a likewise aggressive manner (e.g., deliberately attempting to frustrate the other by driving more slowly, unnecessarily braking suddenly), the incident can escalate: the original tailgater, who may not have intended any harm initially, subsequently responds aggressively to the "victim's" response, potentially with increasingly risky or aggressive behaviours. It must be acknowledged that separating the roles presents substantial challenges, as it is fuelled by a combination of methodological limitations, attribution biases, a tendency for drivers to overestimate their own skills and the innate desire of humans to maintain a positive self-image (Delhomme, 1991; Lennon et al., 2011; Nederhof, 1985).

Self-report surveys are used extensively in road safety research given that driving behaviour does not lend itself well to experimental manipulation. Self-report surveys have advantages in their ease of distribution and ability to capture respondents' personal perspective, but are subject to social desirability biases in the tendency of people to respond in a manner that presents them in a favourable light (af Wåhlberg, Dorn, & Kline, 2010; Lajunen & Summala, 2003; Nederhof, 1985; Paulhus & Reid, 1991). Two variations of social desirability responses are relevant to the study of driver aggression: impression management, which reflects deliberate falsification to provide a complimentary view of oneself, and self-deception, where respondents believe their inaccurate responses are accurate reflections of themselves (Lindeman & Verkasalo, 1995; Paulhus & Reid, 1991).Where the former is concerned, aggression in any context is a highly undesirable behaviour and thus not likely to be readily admitted to; however, this is amplified in the driving context by the well-documented dangers associated with driving. It is likely that motorists wish to present themselves as both safe and non-aggressive drivers (af Wåhlberg et al., 2010).

The second social desirability response, self-deception, adds a complication to driver aggression research when considered alongside evidence from a myriad of studies indicating that many drivers overestimate their own driving skills, regarding themselves as a more competent and superior driver than their fellow motorists (Delhomme, 1991; Groeger & Brown, 1989; Horswill, Waylen, & Tofield, 2004; Lajunen, Corry, Summala, & Hartley, 1998a; Marottoli & Richardson, 1998; Özkan, Lajunen, Chliaoutakis, Parker, & Summala, 2006; Sivak, Soler, & Tränkle, 1989; Yan, Radwan, & Guo, 2007). Overestimating one's driving skills may influence the

reliability of self-reports of driving errors, because drivers who see themselves as skilful drivers, might not notice or admit their mistakes. However, it is recognised that self-deception bias reflects one's worldview and could provide enlightening insights concerning how drivers perceive the world around them, even if that perception does not accurately reflect reality (Paulhus & Reid, 1991).

Nevertheless, studies investigating driver aggression have historically adopted either a victim or perpetrator perspective: participants are asked to describe their likely responses to situations where they are presented as the victim of driver aggression, or to describe how they would respond to a provocation. Fewer studies have investigated the interplay between both perspectives to compare how motivations when a driver is a victim of driver aggression differ from motivations when the same driver is perpetrating it. Considering that self-report data indicates an overlap between victimisation and perpetration of driver aggression, it is important that the dynamics between the perspectives be examined. The current research anticipates that identifying some of the cognitions that influence how driving stimuli are interpreted will assist in elucidating the victim-perpetrator dynamic.

2.5. Prevalence and triggers of driver aggression

A repercussion of the inconsistency in defining and operationalising driver aggression within the scientific community is that accurate reporting of prevalence rates is challenging; a problem that is exacerbated by gaps in the available data due to substantial under-reporting for both non-violent and extreme behaviours alike.

Evidence suggests that even violent offences are underreported, with only 7% of drivers who claim to have been a victim of on-road violence reporting it to police (Fong, Frost, & Stansfeld, 2001). Analyses conducted on police data suggest that driver aggression involving violence accounts for less than two percent of offences annually; however, it must be noted that aggressive driving is not a discrete charge and driver aggression offenses are combined with the generic dangerous driving charge (University of Western Australia Crime Research Centre, 1997; cited in Smith, 2005). Therefore, if police data is subject to underreporting of violent offences, it will not be an informative source of information for milder, non-violent driver aggression. As a result, the most informative available data capturing a broader spectrum of driver aggression behaviours is likely to be self-report data. While informative, it must be stipulated this source of data should be interpreted with

caution due to biases that are inherent to self-report methods and the lack of scientific peer review.

Two recent large self-report surveys in Australia found that 86% of surveyed motorist believe that drivers are becoming increasingly aggressive (Government Insurance Office, 2011). A later survey by the Government Insurance Office (GIO) showed that over half of the respondents reported being tailgated: of some concern, 13% believed that driver aggression was becoming so widespread that they required a weapon such as a baseball bat in their vehicles for protection (GIO, 2013).

Some important patterns can be discerned from AAMI's (2011) Crash Index survey. Despite almost ninety percent of drivers indicating that one should simply ignore on-road provocations, over half of the respondents stated that when they did encounter provocative events, they behaved aggressively. Over half of the respondents reported that they yelled abuse or swore at drivers; 38% claimed to give rude gestures and 18% admitted to tailgating another driver. Moreover, 82% thought their behaviour was justified. These results parallel a number of earlier surveys indicating that many drivers who report being a victim of driver aggression also admit to perpetrating it. An earlier (Australian Associated Motor Insurers, 2007) survey found that 82% of the surveyed motorists reported being the recipient of aggression such as horn honking or swearing, yet almost 50% admitted instigating these same behaviours. Similarly,70% of drivers surveyed by Roberts and Indermaur (2005a) reported experiencing mild driver aggression while 34% claimed to have perpetrated it.

The Victorian Community Council Against Violence (VCCAV, 1999) conducted telephone interviews with 801 Victorian drivers to explore their experiences with driver aggression. In an attempt to conduct a more rigorous self-report survey, quota sampling was employed to obtain a sample representative of the Victorian driving population. This ensured the sample was weighted by age, with an even representation of males and females as well as metropolitan and non-metropolitan drivers. Results found that 73% of respondents reported being the victim of mild, non-violent driver aggression and 41% admitted to perpetrating it. Further, between 18 and 30 percent of respondents stated they had been chased or run off the road by another motorist, while only seven percent admitted committing one of these behaviours.

These data are consistent with surveys from other highly motorised countries including the United States of America, Canada and the United Kingdom, and suggest that many motorists are affected by aggressive driving behaviours as either an instigator and/or recipient (Beirness, Simpson, Mayhew, & Pak, 2001; Hemenway, Vriniotis, & Miller, 2006; Joint, 1997; Marshall & Thomas, 2000; Miller, Azarael, Hemenway, & Solop, 2002; Wells-Parker et al., 2002).

In the United States, an analysis of police statistics by the Surface Transport Policy Project (1999) and AAA Foundation for Traffic Safety (2009) both estimated that 56% of fatal crashes were due to driver aggression. This is likely to be an overestimation as the definition, although excluding on-road violence, included behaviours that are arguably risky rather than aggressive, such as speeding and disregarding traffic signals. Adopting a narrower definition that focused on intentional death or serious injury, Mizell (1997) estimated that 216 driver aggression incidents resulted in death and a further 12, 610 in serious injury between 1990 and 1996. However, weapons were involved in approximately 40% of these cases. Surveys in the United States have also found that up to 40% of drivers report having been the instigator of milder aggression, while less than one percent reported perpetrating more extreme behaviours (Hemenway et al., 2006; Miller et al., 2002; Wells-Parker et al., 2002). In the United Kingdom, a survey of 526 drivers revealed that 88% of respondents had reportedly experienced at least one incident of milder aggressive driving such as headlight flashes, tailgating and obscene gestures (Marshall & Thomas, 2000; Miller et al., 2002). Around 60% of these drivers admitted to perpetrating aggressive driving by committing similar acts.

In Canada, Mann et al. (2007) published the results of a study on drivers' self-reported aggression and crash involvement in a peer-review journal. Defining driver aggression as an attempt by motorists to threaten or injure a fellow motorist, passenger or pedestrian, participants were asked to report on their experiences with driver aggression as either a recipient or instigator, as well as their crash history for the past 12 months. Results indicated that only 4.7% of drivers reporting no experience with driver aggression had been involved in a collision in the past twelve months. Collision involvement doubled to 8.4% for self-reported victims' only and 9.1% for self-reported perpetrators' only. Of drivers admitting to both roles, 12.7% had been involved in a crash. Logistic regression analyses controlling for demographics factors revealed that compared to drivers who indicated no encounters

with driver aggression, the odds of collision involvement were 83% higher for those reporting instigation only, 87% higher for those reporting perpetration and 157% high for those reporting both. This highlights that regardless of whether drivers are victims, perpetrators or both, driver aggression in any form significantly increases crash risk.

Taken together, a number of trends can be discerned from findings derived from driver surveys. First, self-reported rates of driver aggression appear to be quite high and there appears to be a strong positive relationship between victimisation and instigation, with drivers who report being a victim of even mild, non-violent driver aggression also likely to admit engaging in it themselves (Asbridge et al., 2003; Roberts & Indermaur, 2005a; Smart, Stoduto, Mann, & Adlaf, 2004b). Second, there is evidence that involvement in such behaviour poses increased danger, with self-reported experience with driver aggression found to significantly increase risk of crash involvement (Mann et al., 2007). Third, some results provide a rudimentary glance into drivers' conceptualisations about driver aggression by highlighting a contrast between beliefs and behaviour. Some emerging research examining this paradox suggests that it is fuelled by a desire to modify another driver's behaviour (reviewed in section 2.10.1).

2.6. Triggers for driver aggression

Although the types of events that trigger driver aggression have been the focus of much of the research, many of these studies rely on analysis of secondary sources and reports (e.g., Burns & Katovich, 2003; Dukes, Clayton, Jenkins, Miller, & Rodgers, 2001; Smart & Mann, 2002a). These analyses typically arrive at the conclusion that the behaviour of other drivers (e.g., being tailgated, making rude gestures, careless driving) is regarded as provocative. Other publications that rely on primary data arrive at similar conclusions. Tasca (2000) found that over 50% of survey respondents considered speed in excess of twenty kilometres above the speed limit as aggressive; more so if the offending driver tailgated or undertook, as it heightened feelings of threat and intimidation. Additionally, Sarkar, Martineau, Emami, Khatib, and Wallace (2000) analysed three months' of phone call complaints made to the California Highway Patrol in San Diego and found that the most frequently complained about behaviours related to weaving and cutting-off behaviours, followed by speeding and then tailgating. In line with these findings,

Wickens, Wiesenthal, and Rippey (2005) replicated the study by Sarkar and colleagues based on calls to the Ontario Provincial Police, and found that behaviours classified as related to lane usage, followed by speeding were among the most common complaints. Contrasting these findings, Joint (1995; cited in Joint, 1997) and Björklund (2008) found that tailgating was the most common trigger for driver aggression, followed by flashing lights, gestures and vehicle obstruction.

A more methodologically rigorous and recent investigation into behaviours that may trigger driver aggression was conducted by Wickens and colleagues (Wickens, Roseborough, Hall, & Wiesenthal, 2013a; Wickens, Wiesenthal, Hall, & Roseborough, 2013b). Complaints posted to websites allowing motorists to voice their grievances about other drivers were utilised to conduct a content analysis. Data on 5624 complaints spanning eight years were analysed to identify common complaints, and develop a coding frame for analysing future qualitative data. Results found that behaviours such as cutting and weaving, speeding, tailgating and hostile behaviour were the most common behaviours complained about. To validate the coding frame, 202 drivers completed an online driving diary every second day for one week, where they described a negative event involving another motorist in the previous two days. Consistent with the analysis of website data, diary entry analysis found that cutting and weaving accounted for 33% of events reported in diary entries, 20% contained complaints about slow driving, 12% about speeding and hostility from another motorist and 11% concerned tailgating (Wickens et al., 2013a).

More recently, an Australian study by Stephens, Trawley and Ohtsuka (2016) capitalised on the rise of social media to conduct a content analysis on over 80 000 Twitter posts relating to driver aggression, and found that complaints regarding improper speed appeared most frequently. Further, these authors also found that negative attitudes towards other drivers could also be discerned, such that the terms ‘idiot’ and ‘unskilled’ were used to describe other motorists.

Although the evidence described above is certainly valuable, it is important to understand not only what types of on-road events are associated with aggression, but to also understand the reasons why drivers consider these events to be provocative. For example, some studies (e.g., Mizell, 1997; Shinar, 1998) have made the assumption that cutting off behaviours trigger aggression due to the danger imposed by having another vehicle intrude on safe braking distance. While this may certainly be the case, there may also be alternative explanations and further, explanations may

vary between people. Without empirical evidence regarding why these behaviours trigger aggression, the conclusion that it is due to danger remains an assumption.

As section 2.10.2 will highlight, the interpretation and appraisal of an event as a trigger for anger and subsequent aggression are likely to reflect a driver's more general, aggregate beliefs they have about other drivers and the driving environment, expectations for driving and attitudes towards it. Therefore, understanding why particular events are considered provocative in the first instance represents an important part of understanding the appraisal processes that underlie an aggressive response to these provocations.

2.7. Factors contributing to driver aggression

The potential for serious injury to result from driver aggression prompted an extensive body of research dedicated to identifying and developing a profile of the typical aggressive driver and investigating factors thought to contribute to driver aggression. These factors will be examined in depth in the following sections: trait person-related factors, situational factors and the cognitive processes that interact to influence how person-related and situational factors are interpreted.

2.8. Person-related factors

2.8.1. Demographic factors

2.8.1.1. Gender. Studies examining gender differences in the prevalence of driver aggression typically mirror general human aggression, showing it to be greater amongst males; an effect that holds across victimisation and perpetration (Geen, 2001; González-Iglesias, Gómez-Fraguela, & Luengo-Martín, 2012; Hennessy & Wiesenthal, 2001, 2002b; Krahé, 2005; Lonczak, Neighbors, & Donovan, 2007; Smart & Mann, 2002a; Smart, Stoduto, Mann, & Adlaf, 2004a; Tasca, 2000; Westerman & Haigney, 2000). It should be noted that many of these studies have been informed by definitions of driver aggression that encompass a broad range of behaviours, some of which are arguably risky rather than aggressive, and many that tend towards violence and road rage. For instance, Roberts and Indermaur (2005a) utilised a narrow definition of driver aggression that defined the construct in terms of violence. They surveyed over 1200 drivers in Western Australia and found that men were significantly more likely than women to report being both the victim and perpetrator of driver aggression, even after controlling for the higher level of driving

exposure among males. Results also indicated that males were more likely to both engage in and receive rude gestures, tailgating and flashing lights.

In contrast, Hennessy and Wiesenthal (2001, 2002a) utilised an expanded definition of driver aggression which included non-violent behaviours as well as extreme ones. The results for men were only significantly different to those for women where violent behaviour was concerned, such that men reported more violent behaviour than women. No significant differences in reported levels of non-violent aggression between genders were found. Consistent with these results, Wickens et al. (2012) found similar levels of self-reported driver aggression for males and females. Not only were no differences found in the prevalence of driver aggression experiences between males and females, gender was not a significant predictor of driver aggression. Instead, the results suggest that gender may moderate the relationship between non-violent driver aggression and a number of risk factors, with regression analyses identifying mileage, income and psychological distress as variables that increase the likelihood of aggression. Specifically, a greater number of miles driven each week increased the odds of aggression in women, as did higher scores on a measure of psychological distress and an annual income between $30 000 and $49 999. More recently, Suhr and Nesbit (2013) found no gender differences in their study on the mediating role of anger rumination on driver aggression (see section 2.8.2.3).

Consistent with arguments made in general aggression research that mainstream conceptualisations of aggression clash with traditional gender roles, Krahé (2005) investigated the influence of sex role orientation, the extent to which men and women adopt gender consistent characteristics into their self-concept, in driver aggression. Results showed that although femininity was associated with a lower likelihood of self-reported driver aggression, masculinity was not a significant predictor, nor was the interaction between femininity and masculinity.

In sum, it appears that the evidence concerning the role of gender in driver aggression is mixed. Much of the research that has been conducted has focused on violent driver aggression. Thus, based on evidence to date it is reasonable to conclude that findings suggesting males are more aggressive than females may only pertain to the extreme, violent cases of aggression. While gender differences in non-violent driver aggression have only recently begun to receive attention in the

literature, the available evidence suggests that there are no significant differences in non-violent driver aggression based on gender.

2.8.1.2. Age. Research concerning age-related differences in driver aggression has yielded more consistent findings: ostensibly higher rates of self-reported perpetration and victimisation are found in surveys of younger drivers compared to surveys of the general driving population (Elander, West, & French, 1993; Hennessy & Wiesenthal, 1999; Krahé, 2005; Lajunen, Parker, & Summala, 1999; Tasca, 2000; Wickens, Mann, Stoduto, Ialomiteanu, & Smart, 2011). Roberts and Indermaur (2005a) found that drivers aged between 18-29 years old were most likely to report engaging in driver aggression, but also the most likely to report encountering it. Similarly, a recent survey of young Australian motorists found that 50% of young drivers report showing another motorist verbal aggression, 43% reported engaging in obscene gestures and 30% admitted to tailgating. The results concerning victimisation revealed that 65% reporting receiving an offensive gesture from another motorist, 60% reported being tailgated and 27% reported being followed (Australian Associated Motor Insurers, 2012).

In sum, clear consistencies can be discerned from research investigating the impact of age on driver aggression: empirical studies and self-report data both suggest that younger drivers are more likely to engage in aggressive driving behaviours.

2.8.2. Trait characteristics

A personal tendency towards aggression has been linked with a greater tendency to receive traffic citations and a higher risk of collision involvement (Sansone, Lam, & Wiederman, 2010; Sansone, Leung, & Wiederman, 2012; Sivak, 1983). A notable study by Tillmann and Hobbs (1949) that is often regarded as one of the seminal investigations into driver aggression found that "accident-prone" taxi drivers had significantly greater contact with the criminal justice system. This led the authors to coin the often quoted phrase "man drives as he lives," to reflect their conclusions that the driving environment is an extension of the rest of one's life and therefore, one's typical thoughts and behaviour, which may be aggressive, are expressed when driving. Consistent with this, MacMillan (1975, cited in Krahé, 2005) found that aggressive drivers had a significantly greater number of traffic convictions than a general sample of drivers and further, that it correlated with scores

on measures of social problems. These findings generated a considerable body of research seeking to identify the basic traits that give rise to aggression to whether these traits can predict aggression in the driving context.

2.8.2.1. Trait anger and aggression

Understandably, individual differences in the propensity towards anger and aggression have been obvious candidates for their hypothesised role in fuelling driver aggression, with many researchers espousing Tillman and Hobbs' "man drives as he lives" perspective (Arnett, Offer, & Fine, 1997; Deffenbacher, 1992; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003b; Deffenbacher, Oetting, & Lynch, 1994; Lee & Bonfiglio, 2013). These arguments posit that a tendency towards anger and aggression predisposes that individual to perceive provocations in a wide array of situations, even where none exists or where other people might not, and reacting to them with aggression (Baumeister et al., 1990; Dodge & Coie, 1987; Spielberger, 1988). This perspective is in contrast to a plethora of anecdotal reports from drivers describing a "Jekyll and Hyde" phenomenon: drivers remarking that they become uncharacteristically angry and aggressive when they drive (Galovski et al., 2006). This perspective has resulted in suggestions that a propensity towards aggression on the road reflects an underlying context-specific trait characteristic termed trait driving anger (Deffenbacher et al., 1994). An extensive body of research has investigated both perspectives. However, before this research is reviewed, the reader is reminded of the previously mentioned issues in defining driver aggression, that have seen much of the existing literature sometimes refer to driver anger and aggression interchangeably, and other times with distinct meanings.

Supporting the view that driving anger represents a distinct, situational specific type of anger, studies have found weak correlations ranging between $r = .27$ and $r = .33$ between measures of trait driving anger such as the Driving Anger Scale (DAS; Deffenbacher et al., 1994) and measures of general anger, suggestive of two unique constructs (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003a; Deffenbacher, Lynch, Deffenbacher, & Oetting, 2001a; Deffenbacher, Lynch, Oetting, & Yingling, 2001b). Further, Herrero-Fernández (2013) recently investigated the relationship between on and off road aggression. In this study, correlational analyses between measures of general anger and driving anger revealed a moderate and statistically significant association ($r = .34$), providing further

support for the notion that they are distinct traits. However, path analyses to determine how these traits were related to driver aggression behaviours revealed that driver aggression was best predicted by general aggressiveness rather than the context specific driving aggression. The author concluded that although man may not quite drive as he lives, "when he experiences anger, he will express it the same way in any context" (pg. 72).

Parkinson (2001) examined differences in anger in driving situations compared to anger in non-driving situations and found self-reported anger to be more frequent and to have different features and triggers when driving. Anger experienced on-road appeared to be more decisive than off-road anger, which was instead accompanied by more varied emotions. Additionally, driving anger was associated with stronger and more transparent attributions of blame directed towards another driver, and was fuelled by difficulties in communicating when driving. Of note, perceiving that another person was to blame for the anger episode was the most important cause of anger in both on and off road situations. Levels of pre-existing negative emotions were lower in anger-provoking driving situations compared to non-driving related anger. Furthermore, external situational factors such as mood and stress were not found to relate to subsequent driving anger. This latter finding will be revisited in section 2.9, where the review will focus on research pertaining to the influence of situational factors.

Parkinson (2001) offers an insightful explanation for these results that accentuates some unique aspects of anger and aggression in the driving context compared to general settings. Specifically, Parkinson argues that anger expressions in any situation are contingent on two attributes: appraisals regarding the severity of the incident, including the hostile intent behind it, and whether the provocateur notices and responds to the aggressive retaliation directed at them. In instances of off-road aggression, which generally occurs face-to-face, Parkinson highlights that physical and emotional body language can be communicated and interpreted somewhat unambiguously, but these factors are absent in the driving environment. In contrast, drivers' identities are obscured in their vehicles (see section 2.9.1.2 for a further discussion on anonymity), which are then separated by considerable distance, thus removing the potential for cues to be discerned from body language, making communication between vehicles difficult. Therefore, Parkinson suggests that to help communicate anger, it is possible that drivers' aggressive behaviour may be

exaggerated in order to express their anger to the offending driver less ambiguously. Although Parkinson's account is certainly intuitive, research concerning one of the central tenets of his argument, the obscuring of one's identity when on-road, has limited evidence, as will be highlighted in section 2.9.1.2. Taken collectively, the research suggests that while driving anger may be a specific type of anger, aggression in response to anger may not be context- specific.

There is strong evidence supporting the perspective that the road is simply one context where people with a tendency to experience anger and aggression can display it. For instance, the wealth of literature testing the validity of a range of measures of trait driver aggression has demonstrated strong correlations with measures of general aggression, suggesting that the concepts are not separate (Rotton, Gregory, & Van Rooy, 2005; Van Rooy, Rotton, & Burns, 2006).

Lajunen and Parker (2001) examined the role of trait aggression as well as driving anger in contributing to driver aggression. Participants completed a battery of measures including the Buss-Perry Aggression Questionnaire (AQ; Buss & Perry, 1992) to measure general aggression, and the UK adaption of the DAS (Lajunen, Parker, & Stradling, 1998b) which measures driving anger in response to three different triggers: blocked progress, reckless driving and hostility displayed by another driver. The UK DAS requires respondents to indicate the amount of anger they believe they would experience in each situation, as well as their most likely behavioural response to it from a list of seven options ranging in severity. Results yielded weak to moderate correlations (r = .24 to r = .53) between anger experienced in response to each event and likely aggressive responses to them, with the highest correlation found for a situation depicting a hostile behaviour from another driver. Furthermore, path analyses revealed that the relationship between trait verbal aggression and driver aggression was mediated by anger, but trait physical aggression had a direct path to driver aggression. Additionally, those high in verbal aggression indicated the strongest responses to situations involving risky driving and those high in physical aggression in response to hostility and recklessness.

A meta-analysis (Nesbit, Conger, & Conger, 2007) of a fifteen year span of studies examining the relationship between both trait general and driving anger on driver aggression hypothesised that driving anger would have the strongest association with driver aggression and with outcomes such as collisions. Results did not this hypothesis but instead, indicated a moderate, significant correlation between

both types of anger and aggressive driving. This supports the conclusion that regardless of whether the anger reflects a trait disposition towards anger in general or is specific to the driving context, it is still associated with aggressive driving behaviours. However, Nesbit and colleagues drew attention to the potential for common method variance due to the heavy reliance on self-report measures in driver aggression research: all measures of anger were measured by self-report methods, as were the majority of driver aggression measures.

In sum, the notion that driving anger reflects an underlying construct that is distinct from trait anger appears to be redundant when considering evidence that both constructs correlate with greater tendency to self-report driver aggression behaviours that are often dangerous and increase the risk of a crash. Therefore, the perspective of the current program of research concurs with Nesbit et al.'s (2007) conclusion.

2.8.2.2. Hostility

It is hypothesised that individuals high in trait hostility are at increased risk of driver aggression due to their tendency to perceive their environment with pessimism and malice (Britt & Garrity, 2006; Galovski & Blanchard, 2002; Harris & Houston, 2010; Matthews & Norris, 2002; Matthews, Dorn, & Ian Glendon, 1991; Norris, Matthews, & Riad, 2000). Supporting this contention, studies seeking to establish the validity of driving anger and aggression scales have found that these measures correlate measures of trait hostility (Dahlen & Ragan, 2004; Deffenbacher et al., 2003a; Deffenbacher et al., 2001a; Deffenbacher, Lynch, Oetting, & Swaim, 2002; Deffenbacher et al., 2001b; Deffenbacher, White, & Lynch, 2004; DePasquale, Geller, Clarke, & Littleton, 2001). Further, Dula and Ballard (2003) found that trait hostility did not correlate with the measure of risky driving, but did correlate with aggressive driving, suggesting that hostility is unique to driver aggression.

Matthews et al. (1991) identified a tendency towards hostility as an antecedent to driver aggression in a study that sought to examine personality correlates of driver stress. This is consistent with conclusions drawn from a more recent study by Kovácsová, Rošková, and Lajunen (2014) that a disposition towards hostile thinking, particularly concerning the motivations behind others behaviour exerts a strong influence over driver aggression. Similarly, Blankenship and Nesbit (2013) emphasised the role of hostility in fuelling driver aggression, proposing that the driving context activates hostile cognitions, which increases accessibility to

related aggression concepts stored in memory. Supporting this, two studies by Blankenship and Nesbit demonstrated that high anger drivers responded faster than low anger drivers to both neutral and aggressive words paired with driving stimuli.

2.8.2.3. Rumination and Mindfulness

Despite a considerable body of research demonstrating strong links between anger rumination and aggression (Borders et al., 2010; Caprara, Paciello, Gerbino, & Cugini, 2007; Collins & Bell, 1997; Sukhodolsky et al., 2001), the influence of rumination on aggression in the driving context has remained largely uninvestigated. Recently, O'Brien (2010) adopted qualitative techniques in a sample of young Queensland drivers found evidence suggesting that there may be links between rumination and driver aggression, noting this potential relationship as a direction for future research. Similarly, Maxwell, Grant, and Lipkin (2005) in their discussion of the results of their study assessing the validity of the Propensity for Angry Driving (PADS; DePasquale et al., 2001) suggested that the role of rumination in driver aggression should be investigated. However, at the time of writing and to the best of the author's knowledge, only one scientific study investigating the effects of rumination on driver aggression, Suhr and Nesbit (2013), had been published.

Suhr and Nesbit (2013) conducted two studies investigating rumination in driver aggression. Firstly, 142 participants were given a battery of measures including trait anger, self-reported aggressive driving behaviour and trait rumination. Mediation analyses showed that the relationship between trait anger and driver aggression was partly mediated by trait anger rumination, and that gender had no effect on the relationship. In the second study, 129 participants completed the same battery of measures before watching a video depicting a driving scenario where a driver was being tailgated, yelled at and receives rude gestures from another driver. Participants were asked to imagine that they were the victim driver while viewing the video and to then rated how vividly they could identify with the victim driver, as well as their current mood state immediately following the video. Participants were then randomly assigned to either a condition where they were induced to ruminate by completing a task requiring them to focus on their current emotional state, or a distraction condition where they were encouraged to think about the shape of an inanimate object (e.g., an umbrella). Following the experimental manipulation, participants indicated their likelihood of engaging in a range of aggressive driving

behaviours in response to the driving situation they had viewed earlier. Results demonstrated that trait rumination fully mediated the relationship between anger and hypothetical aggressive responses for participants in the rumination condition, but not in the distraction condition. Consistent with the perspective espoused by the GAM, Suhr and Nesbit (2013) suggest that rumination feeds aggression by focusing attention towards the provocation. Rumination then serves to strengthen the association between anger-related concepts in memory and enhances the accessibility of aggressive scripts in semantic memory so that they are more easily primed when faced with future provocations.

Additionally, the findings in relation to rumination and aggression in the distraction condition of Suhr and Nesbit's study suggest that the construct of mindfulness may be a potential protective factor for reducing driver aggression. Section 2.2.3.5 documented evidence that individuals high in trait mindfulness exhibit less aggressive behaviour and that mindfulness decreases aggressive behaviour by disrupting ruminative tendencies. By extension, it is possible that highly mindful drivers may be less inclined to experience anger and aggression on the road, and thus mindfulness represents an avenue of exploration to identify potential ways to reduce the behaviour.

There is a paucity of research that examines both the influence of trait mindfulness in driver aggression and that examines protective factors more broadly. Recently, a study by Kovácsová et al. (2014) examined the notion of forgiveness as a potential protective factor, but despite the study finding a negative relationship between forgiveness and trait anger, support for their hypothesis that higher levels of forgiveness would be associated with lower levels of aggression was not apparent in the results. Mindfulness may represent a more promising alternative as a protective factor, due to the robust evidence for its effect in reducing aggression and anger in other situations.

Similar to rumination, only one empirical study examining the role of mindfulness in the driving context could be discerned from the literature. Specifically, Kazemeini, Ghanbari-e-Hashem-Abadi, and Safarzadeh (2013) experimentally examined the effectiveness of a mindfulness-based intervention for reducing anger and aggression in a sample of 20 male Iranian taxi drivers. Utilising a pre-test – post-test design with a one month follow up, participants were randomly assigned to receive either a Mindfulness Based Cognitive Therapy (MBCGT)

intervention, or traditional Cognitive-Behaviour Group Therapy (CBGT). Using the DAS and DAX to measure driving anger and aggression, as well as a measure of expression of anger, the results showed that compared to drivers in the cognitive-behavioural group, drivers in the mindfulness intervention reported a significant reduction in driver aggression at both post-test and follow up.

Although these findings are promising, the study has some limitations that must be noted. First, the study only included male drivers and, as such, the findings are limited to males. Furthermore, the study was conducted in Iran which could be expected to have a different driving culture to that of Westernised countries, such as Australia or the United States. Additionally, the study was conducted on a sample of professional drivers, namely, taxi drivers. Arguably, taxi drivers are likely to drive more often than recreational drivers and, accordingly, their greater exposure increases their chances of being exposed to potential provocations. In addition to greater exposure to potential provocations, drivers who drive professionally are also likely to encounter more opportunities to practice the mindfulness that they have been taught at the intervention, allowing the training to become reinforced in semantic memory (see section 2.2.4.2). Consequently, the findings of Kazemeini et al.'s (2013) study may not extend to drivers who drive recreationally and whom may not drive regularly enough for the benefits of mindfulness training to be practiced. Finally, although not representing a limitation per se, the study examined mindfulness in relation to it being an intervention which could be taught as opposed to mindfulness as a dispositional personality trait. Arguably, when examining mindfulness as a personality trait, it would be interesting to see if similar results could be obtained. For these reasons, the role of mindfulness in protecting against driver aggression requires further research.

2.8.3. Psychopathology

Extending the assumption that driver aggression reflects maladaptive behaviour patterns, the effect of psychopathologies such as personality disorders and substance abuse on driver aggression have been widely researched. Studies examining the influence of drugs and alcohol typically show that drivers reporting greater problematic use of drugs or consumption of alcohol, including driving while intoxicated, also report greater levels of driver aggression, along with a range of other risky driving behaviours, and commit a greater number of driving offenses

(Adlaf, Ialomiteanu, Mann, Smart, & Stoduto, 2004; Alvarez, Fierro, & Morales, 2011; Butters, Smart, Mann, & Asbridge, 2005; Wells-Parker et al., 2002; Yu, Chin Evans, & Perfetti, 2004). However, these studies also typically conceptualise driver aggression as violent offences.

Additionally, an association between driver aggression and Cluster B personality disorders such as Borderline, Narcissistic and Antisocial Personality Disorder, as well as Intermittent Explosive Disorder has been shown in a range of studies (e.g., Galovski, Blanchard, & Veazey, 2002; Galovski et al., 2006; Malta, Blanchard, & Freidenberg, 2005; Sansone et al., 2010; Smart, Asbridge, Mann, & Adlaf, 2003). Again, these studies limit their definition of driver aggression to extreme incidents tending towards violence, thus offering little insight regarding the influence of psychopathology on non-violent driver aggression. Accordingly, the role of psychopathology, whilst important to understanding the broader picture of aggressive driving, is less relevant to the issues of focus in the current research.

2.9. Situational factors

Although previous studies have suggested a strong influence from person-related trait factors in aggressive driving, it is recognised that the influence of these characteristics does not occur in a vacuum. Rather, these traits interact with and are influenced by a range of environmental and life stressors to affect an individual's current mood state (Simon & Corbett, 1996). Accordingly, the influence of situational characteristics of both the on-road environment and events external to the road are important to consider.

2.9.1. Road environment and vehicle characteristics

2.9.1.1. Territoriality

Territoriality refers to a collection of beliefs, thoughts and behaviours that are based on perceived ownership of space (Altman, 1975; Bell, Greene, Fisher, & Baum, 2001). A handful of studies have applied the concept of territoriality to the driving context, arguing that one's vehicle represents private, personal space and an expression of one's identity. Accordingly, driver aggression is thought to be associated with a strong sense of vehicle ownership and entitlement to road space such that any perceived intrusions on the road are considered threats, and aggression is considered justified to defend space (Fraine, Smith, Zinkiewicz, Chapman, &

Sheehan, 2007; Miles & Johnson, 2003; Szlemko, Benfield, Bell, Deffenbacher, & Troup, 2008).

Supporting this assertion, Fraine et al. (2007) found that focus group participants, particularly men and younger drivers, discussed behaviours such as tailgating and cutting off as deliberate attempts to control, invade or usurp their space, and further, that their aggressive retaliation to these behaviours appeared to be motivated by taking back control over the situation. Similarly, Szlemko et al. (2008) found support for their predictions that owners of vehicles with a greater number of identity markers (e.g., bumper stickers, decals and customised paint jobs) would report higher scores on a scale measuring attachment to their vehicle, and further, that number of identity markers would predict aggressive responses to 10 hypothetical driving scenarios.

In contrast to this evidence, an earlier investigation by Miles and Johnson (2003) argued that the type of vehicle one drives represents an expression of one's identity. As such, Miles and Johnson examined whether vehicle type, as well as identity markers similar to those used by Szlemko and colleagues could predict driver aggression. Using a purpose-designed measure of driver aggression that included items such as "*I flash my lights and tailgate slower drivers in front of me in order to get them to change lanes or drive faster*" and "*I make insulting gestures to other drivers*" (pg. 152), results indicated that that neither the presence of identity markers, nor vehicle type could differentiate between high aggression and low aggression drivers.

2.9.1.2. Anonymity

Within the field of general aggression, it is thought that aggressive impulses are impeded by social norms when people feel identifiable (Postmes & Spears, 1998; Taylor, O'Neal, Langley, & Butcher, 1991). Following from this, evidence has suggested that a diminished sense of identity produces a sense of deindividuation that reduces these restraints and can thus increase undesirable behaviours, such as aggression (Baron & Richardson, 1994; Borders et al., 2010; Silke, 2003). In particular, Zimbardo (1969) argues that having ones identity obscured, that is, being anonymous, is crucial to experiencing deindividuation and, ultimately, aggression. When one is anonymous, he or she cannot be identified and, thus, is likely to feel that his or her actions cannot be judged, nor reprimanded (Ellison, Govern, Petri, &

Figler, 1995).These arguments have been applied to the driving context. It has been argued that the relative anonymity experienced while driving may facilitate driver aggression, explaining why some people may behave more aggressively in the driving context than in other circumstances (Brewer, 2000). In support of this, an observational study by Ellison found that drivers of convertible vehicles with the top down were less aggressive towards a vehicle impeding their progress than drivers whose anonymity was protected by the presence of the car roof. Similarly, compared to participants who drove in an identifiable condition, participants assigned to an anonymous condition in a driving simulator study ran more red lights, displayed greater average speeds, had more collisions and injured more pedestrians (Ellison-Potter et al., 2001). However, caution must be exercised in interpreting these results for two key reasons. First, the earlier study is based on observation and thus the behaviour may not have reflected underlying aggressive intentions. Second, the behaviours used to operationalise aggression in the second study included a range of behaviours that can be considered risky rather than aggressive. Without assessing the underlying motives for the behaviours in both of these studies, it remains unclear whether anonymity fuels driver aggression.

In addition, how identifiable or anonymous recipients are has been found to influence driver aggression. Specifically, O'Brien, Tay, and Watson (2004) found that anonymous offenders aroused more anger than identifiable ones. This study also compared age and gender differences in aggressive behaviour directed towards anonymous versus identifiable drivers. No significant differences in aggressive responses were found between anonymous drivers and young, male drivers, leading the authors to suggest that drivers angered by the behaviour of another motorist will assume the offending motorist is a young male when identifying information about the offending driver is lacking.

2.9.1.3. Passenger effects and exposure

Evidence from research examining the influence of time spent driving on driver aggression suggests that aggression is greater amongst drivers who spend more time driving, a trend that holds across both victimisation and perpetration (Asbridge & Butters, 2013; Smart et al., 2004a; Wickens et al., 2012). A recent telephone survey based study of a cross-section of Canadian drivers, Wickens et al. (2012) found that miles driven annually was predictive of driver aggression in

females. Although it could be argued that this effect can be simply explained by greater opportunity for exposure to potential provocation as a function of greater distance travelled, Bone and Mowen (2006) found that greater distance travelled was associated with both greater aggressive and distracted driving, leading to the suggestion that greater distance travelled increase automaticity and boredom, which potentially lowers driver's personal tolerance for on-road frustrations and provocations.

Further, there has been a considerable body of research that has explored the effect that passengers within a vehicle can have on driving behaviour, however, the findings are mixed and appear to vary according to the relationship between passenger and driver (Chen, Baker, Braver, & Li, 2000; Padlo, Aultman-Hall, & Stamatiadis, 2005; Vollrath, Meilinger, & Krüger, 2002). For instance, while it appears that the presence of passengers decreases crash risk for adults (Williams, 2003), it is well-documented that crash risk increases for young drivers in the presence of passengers (Aldridge, Himmler, Aultman-Hall, & Stamatiadis, 1999; Williams, 2003; Williams, Ferguson, & McCartt, 2007). Further, this risk is heightened for young male drivers when the passenger is also a young male, but decreases if the passenger is female, or a parent (McKenna, Waylen, & Burkes, 1998; Simons-Morton, Lerner, & Singer, 2005).

Reflecting this line of work, a small number of studies have investigated passenger effects in driver aggression. Findings in this area of research are mixed. While Shinar found that having a passenger present in the vehicle inhibited driver aggression, Baxter et al. (1990b) found that the effect was moderated by age, such that driving behaviours such as speeding decreased in the presence of an older female passenger compared to driving alone or with younger passengers. However, both these studies rely on observational data, raising questions about whether the observed behaviour reflects aggressive intentions. Interestingly, Wells-Parker et al. (2002) noted that when passengers were present, drivers frequently complained and yelled about other motorists behaviour. When this is considered alongside evidence regarding catharsis and rumination, it is possible that simply complaining about others driving may increase anger and potentially fuel aggression.

2.9.1.4. Congestion

Perhaps the most widely investigated situational factor that has been studied for its contribution to driver aggression is traffic congestion. Many researchers (e.g., Hennessy & Wiesenthal, 1997, 1999; Shinar, 1998, 2007; Shinar & Compton, 2004) and drivers alike suggest that driver aggression is a result of increasing congestion on the road (Australian Associated Motor Insurers, 2005). Specifically, Shinar (1998; Shinar & Compton, 2004) maintains that congestion has caused an increase in driver aggression, because many driving situations now surpass many more individuals' thresholds for frustration. Although this argument is intuitively appealing, the empirical evidence concerning the impact of congestion is mixed at best.

Some researchers (Hennessy & Wiesenthal, 1999; Hennessy, Wiesenthal, & Kohn, 2000; Shinar, 1998) have found evidence of increased driver aggression in congested conditions. For instance, Hennessy and Wiesenthal (1997) found that compared to low congestion conditions, drivers reported feeling greater levels of stress in heavy traffic congestion, and further that aggressive behaviours such as deliberately tailgating and horn-honking were reported more often in high congestion than low congestion. Additionally, aggressive behaviours were found to increase when heavy congestion was encountered later in the journey, after experiencing low or normal driving conditions. However, although participants were studied in both high and low congestion conditions, they were only studied on the one trip, meaning that mood, and other factors may have influenced response. Further, mobile telephones were used to interview participants as they drove. Although certainly an innovative method, with advantages such as being able to capture responses in real time, it is possible that the use of the mobile phone, even if hands-free, added an additional demand to the task of driving, increasing feelings of stress and potentially, subsequent aggressive behaviours.

Similarly, in an observational study, Shinar and Compton (2004) reported greater levels of aggressive driving during rush hour periods and used regression analyses to demonstrate that aggressive behaviours were more frequent during rush hour compared to non-peak periods, even after adjusting for the greater number of drivers on the road during peak conditions. However, the result were based on data collected through observational methods and thus the behaviours observed may not have been motivated by underlying aggressive intentions.

Conversely, many studies have failed to find a significant relationship between driver aggression and congestion. Lajunen and colleagues (Lajunen et al., 1998b; 1999) found no significant relationship between driving in congested conditions and aggressive behaviours in three large samples across Great Britain, Finland and the Netherlands. Similarly, Underwood, Chapman, Wright, and Crundall (1999) found no relationship between reports of anger or aggression and traffic congestion. A possible reason for this lack of relationship is that congestion often occurs at predictable times, allowing it to be anticipated and catered for. Therefore, congestion may only increase aggression when it is unexpected.

Rather than congestion, some researchers have investigated the role of time pressure as a situational influence of driver aggression. Supporting this, Harris and Houston (2010) found that although tailgating and horn-honking were more frequent among both men and women when pressed for time compared to when under no time pressure, the effect was stronger for women. Consistent with this O'Brien et al. (2004) found that self-reported anger and severity of behavioural responses to provoking events was greater when participants were depicted as experiencing time pressure (running late for an appointment).

2.9.2. Stress

Situational characteristics external to the road, particularly stress (e.g., work stress, life stressors) have been investigated for their propensity to affect driver aggression (Gulian, Glendon, Matthews, Davies, & Debney, 1990; Hennessy, 2008; Hennessy & Wiesenthal, 1997, 1999; Matthews, Tsuda, Xin, & Ozeki, 1999). Gulian and colleagues (1990) and Hennessy and Wiesenthal (1999) found that participants reporting a difficult day at work subsequently reported greater levels of stress, fatigue and aggression on their commute home. Further, Hoggan and Dollard (2007) explored the influence of work stress on driving anger in a sample of Australian drivers and found that drivers reporting greater levels of anger on the road generally believed their efforts at work were disproportionate to the rewards they received.

The influence of work-related stress on driver aggression has also received cross-cultural attention. Matthews et al. (1999) compared Japanese drivers to a sample of British drivers, both of which completed measures assessing propensity towards driver stress, occupational status, working hours and holidays, as well as life stressors and accident involvement. Results found that while the work stress

variables were related to greater driver stress in the British sample, the relationship was not as strong in the Japanese sample, leading the authors to conclude that Japanese drivers may have a higher threshold for work-related stress. Similarly, McLinton and Dollard (2010) investigated work stress and driving anger in a sample of Japanese drivers. Contrary to their predictions, these researchers found that Japanese drivers reported lower driving anger than Western samples, despite reporting significantly higher levels of work stress, leading to the suggestion that Japanese drivers may have different attitudes regarding acceptance of anger on the road. Two points can be drawn from these cross-cultural studies: first, that work stress appears to be a more important factor influencing driving anger in Western countries, and second, that beliefs and attitudes about driving and driver aggression may be influenced by cultural norms and standards.

2.10. Cognitive factors

The review thus far has discussed the factors that have historically been the focus of research: person-related and situational correlates of driver aggression. Although there a many different ways that drivers can interpret the same situation, which will ultimately influence how they respond to it, psychological and cognitive processes involved in interpreting on-road events as influences on driver behaviour have only recently begun to gain attention. Much of this research has been framed within attribution theory.

2.10.1. Attribution theory

Attribution theories maintain that in order to understand and interpret the world around them, people make attributions regarding the cause of behaviour, both their own behaviour and that of others, based on the feelings, beliefs and intentions thought to motivate the behaviour (Heider, 1944; Jones & Davis, 1965; Lazarus, 1991; Weiner, 1986). Attribution theories are rooted in social cognition, arguing that appraising a situation and assigning an attribution to it is a fundamental determinant of subsequent behaviour (Dodge & Coie, 1987; Novaco & Welsh, 1989). In particular, Weiner's causal attribution theory (Weiner, 1986; Weiner, 2001, 2006) offers strong potential to enhance understanding of aggression in the driving context.

Causal attribution theory maintains that attributions regarding the cause of our behaviour and the cause of others' behaviour are based on five dimensions: locus

of causality, stability, globality, controllability and intentionality. Locus of causality refers to whether the event is attributed internal or external factors. To illustrate in the driving context, imagine a driver who is cut off by another motorist. The cut off motorist would make an internal attribution if they decide that the driver cut them off because they are an impolite, dangerous driver who lacks character: that is, inherent dispositional characteristics of the driver are being emphasised in explaining the cause of the behaviour. Alternatively, if the cut off motorist made an external attribution, they would regard the cut off driver's actions as a mistake or a lapse in judgment.

Stability denotes whether the event is attributed to stable, enduring causes or to transient ones and globality, although conceptually similar to stability, refers to whether the cause was due to something generalisable across various situations. To explicate, stability is whether the cause is stable over time and globality is if the cause is stable across situations. Extending the cutting off example, a stable attribution would be made if the driver in question believed that the motorist who cut them off routinely cuts motorists off on that particular stretch of road, whereas a global attribution would be made if they believed that the driver cuts people off in many situations. Furthermore, intentionality refers whether the attribution considers the behaviour to be deliberate or accidental, and controllability refers to whether the behaviour or event could be controlled, or whether it was preventable. Thus in the cutting off example, an attribution of intentionality would see the cut off motorist believe that the driver who cut them off planned to do so, and attributions of controllability would be determined by how much control cut-off driver believe the motorist who cut them off had over the situation.

Weiner proposes that attributions will be made according to these dimensions such that if the behaviour in question is perceived as controllable, intentional and stable across both time and situation, and is perceived to have stemmed from internal characteristics, attributions of responsibility will increase. Thus if a driver makes an internal, stable, global attribution regarding the behaviour of another motorist, and considers the behaviour to be intentional and controllable, they will hold the driver in question responsible for the event. In turn, this is likely to elicit feelings of anger, which can result in subsequent aggression.

Weiner's theory can also be applied to demonstrate how attributions may decrease the likelihood of aggression: if external, unstable characteristics are

emphasised in an attribution and the event is not perceived as intentional or controllable, attributions of responsibility will be minimised and may result in feelings of concern, sympathy or empathy for the target, which may in turn motivate prosocial behaviour. Supporting the relevance of Weiner's theory in understanding driver aggression, Wickens, Wiesenthal, Flora, and Flett (2011) recently applied the theory to understand aggression in the driving environment and found that attributions of responsibility mediated the relationship between perceived controllability, intentionality and internal locus of control about a negative driving event found and subsequent anger.

Additionally, a number of flaws and biases in the attribution process that hold the potential to increase the likelihood of attributions of responsibility have been identified. In particular, the "actor-observer bias" is germane to the current research, as it may help to elucidate the psychological processes behind the victimisation and perpetration overlap. The actor-observer bias refers to the tendency of people to overemphasise external, unstable situational factors when explaining their own poor behaviour (i.e., when they are the actor) yet attributing someone else's negative behaviour (i.e., when they are the observer) to stable, internal, dispositional causes (Jones & Nisbett, 1971). Again, cutting-off behaviours can provide an example. Congruent with the actor-observer bias, the cut-off driver will likely conclude that the offending driver deliberately cut them off, because they are a terrible driver (a stable, dispositional cause that holds them responsible); however, when that recipient driver cuts off another motorist, they would be likely to explain their behaviour as a mistake or a lapse in judgement (an external, unstable cause).

Evidence of the actor-observer effect in driver aggression can be found from a handful of studies. Baxter, Macrae, Manstead, Stradling, and Parker (1990a) found that where participants instigated a provocation, external, situational factors were used to explain the behaviour, whereas when they received the same provocation, enduring personality traits were given emphasis as the cause. Similarly, Britt and Garrity (2006) found that drivers who attributed potential provocations such as tailgating or being cut-off to internal- stable characteristics of the offending driver reported greater levels of anger and subsequent aggression. More recently, Lennon and colleagues (2011) assigned participants to a victim or perpetrator condition and presented them with a number of written scenarios depicting events with the potential to provoke driver aggression. Participants in the victim condition attributed

the cause of the perpetrator's behaviour to driving incompetence, whereas those in the perpetrator condition endorsed lapses in judgement to explain behaviour that was ostensibly their own. Moreover, Parker, Lajunen, and Stradling (1998) found that driver aggression was perceived as less offensive by participants when asked to describe their thoughts on another driver's aggressive behaviour when that aggressive behaviour presented as retribution for another driver's behaviour.

These empirical findings appear to mirror responses provided in driver surveys: in Australia, survey respondents described their experiences with driver aggression in terms of another motorist's inadequate driving skills when discussing incidents where they were the victim of it, yet described their own aggressive behaviour as justified in light of another motorist's poor driving behaviour (AAMI, 2007; cited in Lennon et al., 2011; AAMI, 2011; VCCAV, 1999). Although there are some studies that have looked at the actor-observer bias in driver aggression, fewer studies have examined the hostile attribution bias in fuelling driver aggression.

Dodge, Pettit, Bates, and Valente (1995) suggest that hostile attribution biases generate perceptions of another's behaviour as being deliberately negligent, inattentive or selfish; all of which may then sanction aggressive behaviour by conceptualising it as warranted retaliation. Matthews and Norris (2002) investigated the hostile attribution bias in aggressive driving: consistent with trends in general aggression, these researchers found that when presented with an ambiguous on-road situation (a driver speeding up slightly when being overtaken), those with greater trait aggression perceived greater hostile intent; viewing the behaviour of the driver as spiteful, vindictive or unreasonable. In contrast, drivers low in trait aggression were less likely to perceive hostile intent, and were more likely to perceive the driver's actions as unintentional. Matthews and Norris note that hostile attributions in the driving context may serve as a self-fulfilling prophecy by enhancing drivers' expectations of encountering negative events. Consistent with this, Yagil (2001) found that negative beliefs and expectations surrounding other drivers' abilities were associated with increased self-reported aggressive behaviours, highlighting that if a driver who holds negative beliefs regarding other drivers' engages in an act of driver aggression and the recipient driver retaliates, the belief becomes a self-fulfilling prophecy and the negative image of other drivers is thus reinforced.

Another line of research has investigated how trait characteristics influence differences in attributional style. Wright et al. (2009) argued that the attribution

process is distorted for individuals disposed to greater trait anger: they have warped attributions concerning fairness and intent, and perceive a broad range of behaviours to be motivated by hostile intentions. Recently, Blankenship and Nesbit (2013) and Nesbit and Conger (2011) examined this argument in the driving context, and demonstrated that aggression-related stimuli can prime aggressive thoughts in motorists reporting high levels of driver anger. Blankenship and Nesbit (2013) found that motorists high in driving anger responded quicker when primed by an aggressive word (e.g., assault, attack, torture) paired with a driving related stimulus than with a neutral word (e.g., button, field, import). Following the prime, faster response times predicted greater levels of self-reported anger in response to a provoking driving scenario.

Similarly, Nesbit and Conger (2011) presented participants with video footage of either an anger provoking driving situation (tailgating) or a neutral driving situation (trying to find an address in the rain) and found that high anger drivers tended to overstate the magnitude and impact of the anger-provoking situation and displayed fewer thoughts aimed at defusing angry thoughts and minimising negative emotions. Taken together, these studies suggest two things: first, that the driving environment may easily cue aggression related concepts stored in memory for some drivers; and second, that priming such concepts increases the association.

A recent qualitative exploration of cognitions in driver aggression by Lennon and Watson (2011) was able to elucidate some potential reasons why drivers use aggressive behaviour. Specifically, this study found that for some drivers, their aggressive actions such as horn-honking, tailgating and rude gestures for two reasons: to communicate criticism or disapproval of another driver's behaviour with a view to prompting the recipient to amend his or her driving; or as justified retaliation for perceived antagonistic behaviour from another motorist. Consistent with Weiner's theory, motives of justified retaliation were cited by drivers in this study in situations where they believed they have been subject to a deliberate, intentional aggressive behaviour performed by another driver. In these situations, Lennon and Watson's finding suggested that the provocation was responded to in an "eye for an eye" manner: deliberate retaliatory aggression intended to offend or vilify the other driver and convey having taken umbrage at the initial provocation. This motive of justified retaliation has parallels with a small body of research investigating vengeance in driver aggression.

Vengeance refers to attempts to rectify a perceived interpersonal transgression through the use of pain, harm, embarrassment or aggravation directed at the offender (McCullough, Bellah, Kilpatrick, & Johnson, 2001). Studies by (e.g., Hennessy & Wiesenthal, 2002a; Hennessy & Wiesenthal, 2002b, 2005; Wiesenthal, Hennessy, & Gibson, 2000) have found that drivers with more vengeful attitudes are at greater risk of violent behaviour in response to innocuous behaviours they interpreted as aggressive. Hennessy and Wiesenthal (2002a; 2002b) found that greater levels of vengeance interacted with milder driver aggression behaviours to predict greater self-reported levels of driver violence, and that the effect was stronger in males. Thus although research concerning vengeance is limited, the current evidence suggests that it is associated with violent aggression, that is not within the scope of the current research.

2.10.2. Beliefs and attitudes

Social cognition maintains that perception is guided by schemas, which include beliefs, attitudes, expectations and perceived norms regarding a concept (Fiske & Taylor, 2013; Huesmann, 1998; Neisser, 1976). A paucity of research exists examining beliefs and attitudes involved in driver aggression and consequently, the beliefs and attitudes that contribute to driver aggression by shaping appraisals are not well known (Miles & Johnson, 2003).

It has been suggested prejudiced attitudes and beliefs may underlie driver aggression, arguing that drivers who are targets of prejudice and discrimination in a wide variety of setting may likewise experience such acts on the road through driver aggression (Dukes et al., 2001; James, 2000). However, a study where participants were presented with two vignettes depicting on-road provocations including cutting off and slow driving, Dukes et al. (2001) failed to find support for this hypothesis by manipulating characteristics of the offending driver to include female drivers, younger and older drivers, as well as ethnic minorities. Conversely, using a similar methodology to Dukes et al., (2001), O'Brien et al. (2004) found that, although both elderly and young female drivers aroused similar levels of anger when they were presented as instigators of an on-road delay, aggressive retaliation was less likely when the offender was elderly. This is presumably because aggression against the elderly is considered less socially desirable than aggression against other age groups.

Alternatively, these findings may reflect perceptions that the elderly are less responsible for causing provocations, due to ageing related changes.

Miles and Johnson (2003) explored beliefs and attitudes concerning one's own aggressive behaviour while driving. Participants were required to indicate their level of agreement with items designed to assess beliefs and attitudes regarding their driving (e.g., "*I am the most important driver on the road*" and "*there are too many road rules*"), as well as how frequently they engaged in aggressive driving behaviours (e.g., tailgating and obscene gestures) and their perceptions of their own abilities as a driver. Results were compared between a community sample and a sample of drivers with a history of traffic violations, and showed that both samples rated themselves as above average drivers, despite the violator sample having repeatedly received citations. Further, violators were found to endorse more negative attitudes and beliefs and reported engaging in aggressive driving behaviours more frequently than the community sample.

Although these findings provide some insight into how beliefs about oneself as a driver may influence driver aggression, they do not explore the beliefs and attitudes drivers hold about others motorists, which are important in an interactive environment like driving. It is plausible that if drivers tend to perceive themselves as a better driver than most other, by extension, they likely perceive other motorists as less skilled than themselves, a belief that could impact subsequent appraisals of other driver's behaviour and subsequent responses to it. To elucidate, if a driver believes that they are more skilled and important than other motorists, and that other motorists are not adequate driver, they may be more inclined to perceive driving behaviours of others that may actually be a simple mistake, as a reflection of their poor driving skills and respond with aggression. Indeed, Lennon and Watson's (2011) findings suggest that drivers aggress towards those they believe have behaved poorly, and thus it is possible that believing other motorists are 'bad' drivers underpins motives to retaliate. To that end, one of the few identified study to have examined interpersonal antecedents of driver aggression is that of Yagil (2001).

Yagil (2001) argues that as drivers interact with others, they form a collective image of 'other drivers' based on these interactions over time. This collective image contains traits and behaviours thought to represent particular groups of drivers, which then influences the interpretation of the behaviour of such groups. Aggression is said to result when drivers hold predominantly negative views about other

motorists. To test this hypothesis, 150 male participants responded to three vignettes depicting provoking on-road events (e.g., a slow driver speeding up when being overtaken) by indicating the attribution they would be most likely to make for the and their most likely behavioural response to it. Participants also completed measures to assess the aggregate image they hold of other drivers. The results supported the predictions, demonstrating that a negative view of other drivers tends to be a stronger predictor of aggressive behaviour than attributions for the event in isolation; albeit it was recognised that the aggregate image one holds of other drivers is likely to affect attributions.

Further to this, Yagil, draws attention to the fact that a driver's beliefs are likely to be influenced by driving culture. Lonero (2007) describes driving culture as the "common practices, expectations, and informal rules that drivers learn by observation from others in their communities" (pg. 7). In line with this, Yagil maintains that where driving culture tends to be aggressive, drivers may be more prepared to make negative, hostile attributions regarding others drivers' actions because they are likely to have had previous experiences with bad driving.

Lonero (2007) also maintains that driving culture is subject to variation between regions, communities and even countries. Reflecting this, a recent study by Sinclair (2013) explored and compared the attitudes and beliefs of young drivers in South Africa to young drivers in Sweden. Sinclair points out that South Africa, a country with high levels of corruption mistrust, along with high levels of crime and interpersonal violence, also has a very high number of road deaths and high levels of driver aggression. In contrast, Sweden boasts one of the lowest rates of road deaths in the world, and is known to be a calm society where its citizens are trusting of the authorities. Thus, based on such differences, Sinclair argues that it is possible that the wider societal culture and attitudes of each country may also manifest in the attitudes of their drivers. As expected, markedly different attitudes towards driving were found in each country. Mirroring Yagil's findings, the South African sample appeared to have a predominately negative view of other drivers: only 24% of South African drivers agreed that their fellow motorists obeyed and respected the road rules, and they described their fellow drivers as aggressive, impatient and inattentive. In contrast, 77% of the Swedish sample believed that their fellow motorist obeyed and respected the road rules and they described their fellow motorists as tolerant, safety-conscious and attentive. Interestingly, 99% of the South African sample rated

themselves as ‘excellent’ or ‘good’ drivers, compared to only 65% of Swedish drivers. Finally, as described previously (in section 2.5), a recent study by Stephens (2016) found that drivers in Australia expressed a general negative attitude about their fellow motorists, using derogatory words such as ‘idiot’ to describe them. Thus, when Stephens’ findings are considered alongside those of Sinclair’s, it is reasonable to suggest that driving culture in Australia may be aggressive.

In sum, Yagil’s and Sinclair’s results have important implications that emphasise the importance that attitudes and beliefs have on behaviour. Further, they indicate a cyclical process creating a self-fulfilling prophecy: driving culture may promote negative beliefs about other drivers, which may then increase the tendency to perceive poor behaviour on the part of other motorists, which may then increase the likelihood of an aggressive response. If the aggressive response elicits retaliation from the other driver (who feels attacked), the existing negative image is likely to become reinforced. This cycle is depicted in Figure 2.3 below.

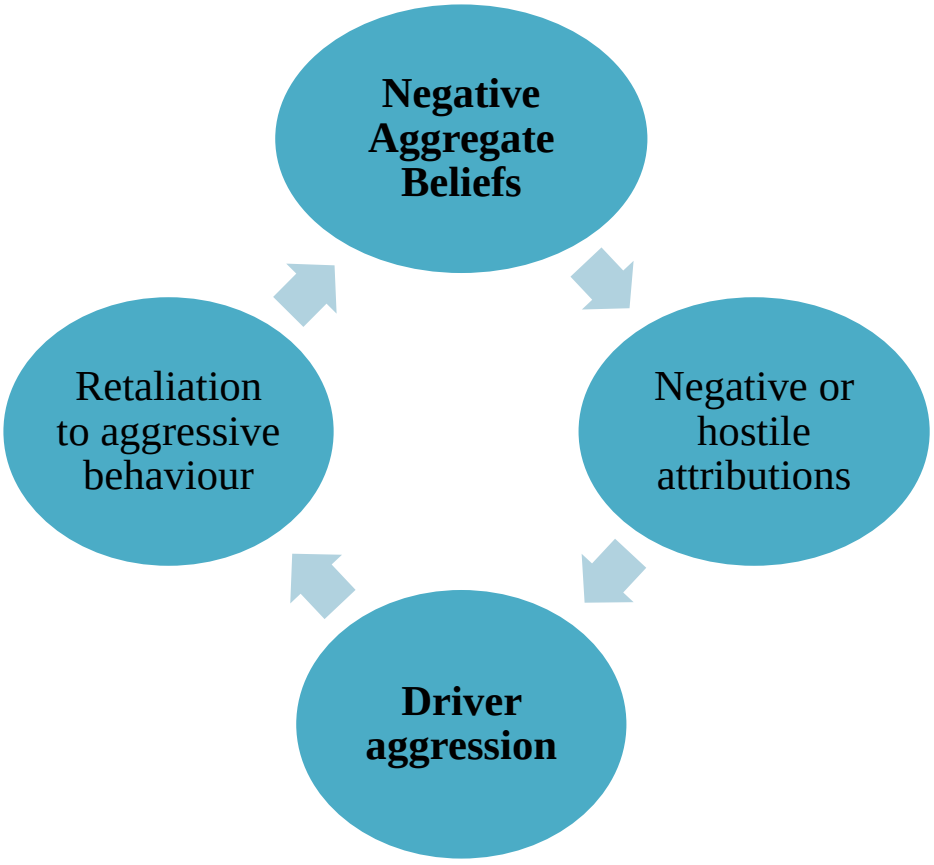

Figure 2.3.Theorised cycle of negative beliefs and aggressive driving behaviour.

In sum, it is evident that beliefs and attitudes regarding another driver's and one's own driving behaviour may be important factors that contribute to driver aggression, for the influence they have in forming attributions. Accordingly, understanding the beliefs and attitudes that determine driver aggression is imperative to the development of effective interventions to reduce the behaviour through changing attitudes that underpin driving behaviour (Goldenbeld, Levelt, & Heidstra, 2000; Lawton, Parker, Manstead, & Stradling, 1997). Scientific investigation concerning beliefs and attitudes in relation to on-road aggression these factors has been limited to date and thus represents a crucial avenue for future research.

2.11. Theories and models of driver aggression

Although a comprehensive review of the theories and models that have been applied to understanding driving behaviour is beyond the scope of the current thesis, a recent review by Glendon (2011) identified a total of 174 models, frameworks and theoretical perspectives in the traffic psychology literature between 1998 and 2008. Many of these theories appeared to have a largely cognitive base, with some of these theories supplemented by aspects of social, behaviour and/or human factors approaches (e.g., the Theory of Planned Behaviour). Despite having identified these models, Glendon noted that, overall, "published research in traffic psychology is primarily characterised by an atheoretical approach" (pg. 554), and he suggested that of the published papers included in the review, 85% of them had no identifiable theoretical or conceptual basis. Moreover, Glendon argues that it is imperative that traffic psychology develop a sound, testable theory that can both guide research, and be used to developing road-safety interventions. Although Glendon's review did not focus specifically on theories and models that solely address risky, dangerous driving behaviour, when exploring the body of driver aggression literature, it is apparent that Glendon's conclusions extend to research into driver aggression. In particular, a review of the driver aggression literature reveals that there are few theories or models that have been applied to understanding driver aggression.

2.11.1. Social maladjustment theory

Social Maladjustment Theory (SMT) is a general perspective that has been applied to understanding aggression in the driving context. SMT suggests that people maintain a level of stability in their behaviour across different situations.

Consequently, those who are aggressive in everyday life will likewise behave aggressively on the road (Shinar, 2007; Tillmann & Hobbs, 1949). The social maladjustment approach grew from findings by Tillmann and Hobbs (1949)and MacMillan (1975, cited in Krahé, 2005) showing that drivers with a history of traffic convictions and collisions also had greater contact with the criminal justice system, and higher scores on measures of social problems. Consistent with these early findings, Sansone et al. (2012) found a positive correlation between aggressive tendencies and a greater number of driving citations in a sample of American drivers using self-report methods.

Support for the SMT perspective in understanding driver aggression can also be found in research examining aggressive driving behaviours in populations diagnosed with personality disorders. There is strong evidence demonstrating a positive link between aggressive driving and personality disorders such as antisocial, narcissistic and borderline personality disorders, as well as those related to substance abuse. As these disorders represent severe impairments to cognitive and emotional functioning, often associated with greater tendency towards aggression in everyday life, it is likely that such impairments extend to the driving environment.

Similarly, studies in offender populations also offer support for SMT. Smith, Waterman, and Ward (2006) compared the scores of incarcerated inmates and the general population on questionnaires assessing trait aggression, driving anger and violence. The offender sample scored higher on measures of driving anger and aggression, with offenders perceiving rude gestures and physical attacks as highly provocative and equal in aggressive intensity. In contrast, drivers from the general population rated physical attacks as a more severe provocation than rude gestures. As it is well documented that offenders display hostile perceptual biases in many facets of life, these findings suggest that such biases also extend to the driving environment. Similarly, Carroll, Davidson, and Ogloff (2010) compared characteristics of drivers engaging in on-road violence to general violent offenders and found no differences in terms of demographic characteristics, criminal history and psychiatric health between the two groups; suggesting they are similar.

Taken collectively, although there appears to be a strong body of evidence supporting the SMT perspective of driver aggression, it cannot account for the plethora of anecdotal evidence from individuals stating they become unusually aggressive in response to ostensibly minor provocations on the road (Galovski et al.,

2006); nor does it explain the high levels of self-reported perpetration evident in driver surveys. Furthermore, limitations are evident in that the studies supporting SMT adopt a narrow view of driver aggression that involves violence rather than incorporating a range of aggressive behaviours that vary in severity. As such, the explanatory power of SMT in understanding driver aggression appears to be limited to the more extreme cases of the phenomenon, suggesting that it is maladjusted and violent individuals who tend to perpetrate on-road violence.

2.11.2. Shinar's Frustration-Aggression model

The most thorough model of driver aggression to date is Shinar's (1998) application of the frustration-aggression hypothesis (Dollard et al., 1939, see section 2.2.4.1) to the driving environment, where Shinar asserts that impediments such as traffic congestion cause frustration. Once a driver's threshold for frustration is surpassed, the model holds that aggression results. If the situation permits an aggressive response, (e.g., cultural driving norms, no police presence) drivers can adopt either a hostile or instrumental aggressive response. Instrumental aggression in the driving context is said to occur when the driver engages in behaviour to circumvent the impediment, such as weaving and tailgating. In contrast, a hostile aggressive driving response is one that is primarily and intentionally aimed at harming the source of frustration (e.g., beeping the horn, flashing lights). If an aggressive response is not possible due to cultural norms, lack of anonymity, or police enforcement, aggression is displaced to another setting. This model is depicted in Figure 2.4.

Echoing Bandura's (1977) comments regarding the frustration-aggression hypothesis, although the idea that driver aggression is simply the result of frustration is intuitively appealing, a number of significant limitations are evident. Firstly, because the premise of the model is the frustration-aggression relationship, it cannot adequately capture the impact of dispositional characteristics, environmental factors, personal history, and beliefs and attitudes on driver aggression: it cannot adequately explain why some motorists, despite facing extremely frustrating events on the road, which they subjectively experience as frustrating, purposely employ calming strategies rather than becoming aggressive, and why others become angry at seemingly minor provocations (Galovski et al., 2006). Thus the frustration-aggression hypothesis as applied to the driving context is subject to the same

criticisms in non-driving contexts for its limited capacity to account for cognitive appraisal processes involved in perceiving a provocation and determining whether it warrants a response (Lennon et al., 2011; Pashler, 1999; Yagil, 2001).

Further, Shinar's model differentiates between hostile and instrumental aggression, which Bushman and Anderson (2001) describe as a dated conceptualisation of aggression that presents limitations in accounting for multiple motives. To illustrate, a driver may tailgate another motorist to signal to them to speed up, so that the frustrated driver can progress. They may also tailgate to convey their criticism of the driver's behaviour for some other perceived driving transgression. Alternatively, tailgating can be used to both communicate disapproval of the other motorist's behaviour and to urge them to move.

Finally, the frustration-aggression approach to driver aggression does not encapsulate the cyclical nature of this process that may lead to an incident escalating. It is increasingly recognised that although non-violent driver aggression behaviours such as horn honking are not risky in isolation, their inherent danger stems from the potential for retaliation, evolving to a serious confrontation (Hennessy & Wiesenthal, 1999; Novaco, 1991). Shinar's model does not appear to capture the cognitive processes that give rise to escalation.

In sum, although the frustration-aggression approach to driver aggression offers an intuitive explanation for the phenomenon, it is limited in its power to explain the cognitive processes that motivate the behaviour. Therefore, with limited consideration of the cognitive processes involved in mediating behaviour, including how driver aggression events can evolve into more serious incidents, the model offers little in the way of explaining the dynamic nature of driver aggression.

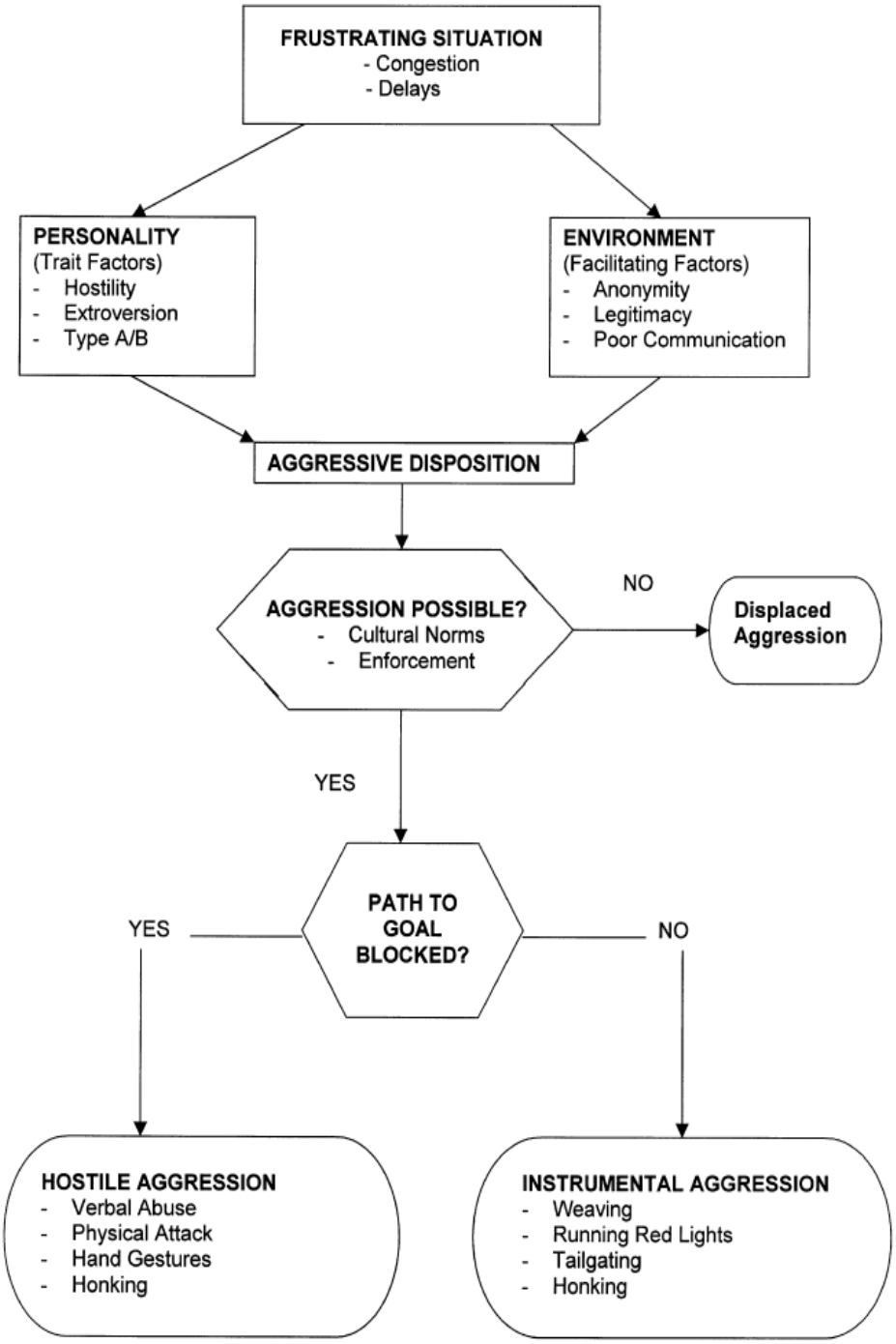

Figure 2.4. Shinar's Frustration-Aggression Model of Aggressive Driving. (Shinar, 1998, pg.140).

2.11.3. The social-cognitive model of driver aggression

Following the development of the current program of research Dula, Geller, and Chumney (2011) proposed a social cognitive model of driver aggression that aligns well with the theoretical direction the current research adopts. As shown in Figure 2.5, the social-cognitive model of driver aggression reflects the GAM by incorporating environmental factors, trait characteristics and cognitive processes including correspondence bias, which refers to a tendency to attribute other's behaviour to stable underlying personality attributes. The model describes how these processes interact to affect the perceptions and appraisals of triggering events, which ultimately affects behavioural reactions.

To illustrate, the model begins with environmental factors, such as congestion or weather, which are posited to interact with state characteristics of the driver, such as their mood or time pressure, to affect their perceptions of a triggering event. Following the provocative event, the subsequent factors in Dula's model concern attributions made regarding the cause of the provocation. In particular, the presence of correspondence bias in the driver will determine the appraisal made: if correspondence bias is present, the driver is likely to attribute hostile or negative intent to the offending driver, increasing the likelihood that they will experience a negative emotional reaction. The next factor in the model reflects individual differences in trait aggression and anger, which are then theorised to affect the driver's response. The model concludes by anticipating how the driver will respond based on the suggested interactions between correspondence bias and trait characteristics. Although this model reflects the GAM to consider the interaction between person-related, situational and cognitive factors, Dula and colleagues did not test this model to explore the extent to which it can account for driver aggression. To the best of the author's knowledge, no additional studies testing this model have been conducted.

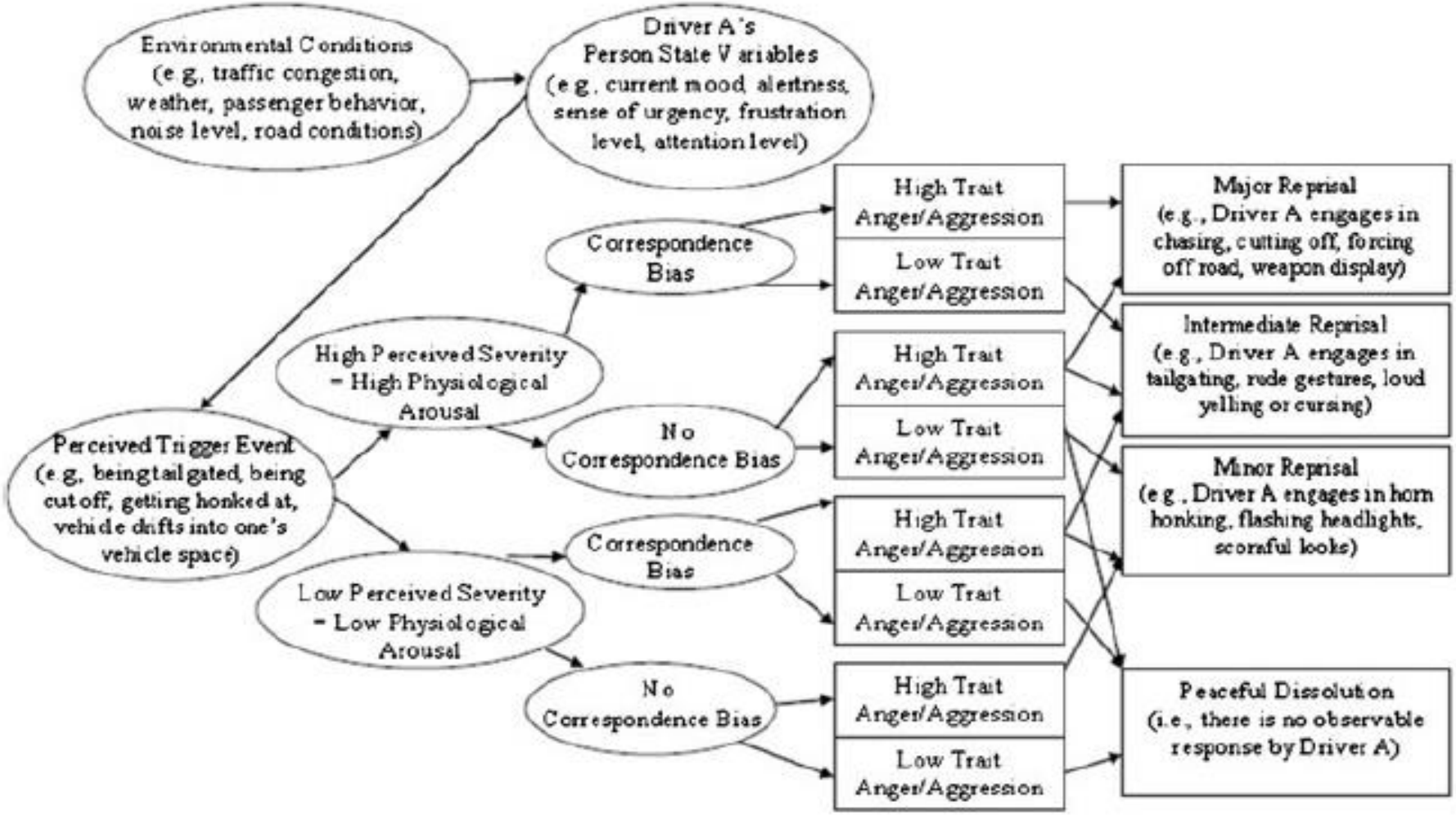

Figure 2.5.Social cognitive model of driver aggression (Dula et al., 2011 pg. 330).

2.12. Summary and gaps identified

Driver aggression is regarded as a leading concern of motorists, with many drivers claiming to have experienced driver aggression as a victim, yet somewhat paradoxically, also admitting to perpetrating is. Regardless of whether one is a victim or perpetrator, driver aggression has been linked to increased crash risk and despite the community concern and links to collision involvement, the fundamental causes of driver aggression are currently not well understood in the scientific literature.

The preceding review highlights the complexity of empirical investigation into driver aggression and has identified five important gaps that require addressing in order to advance understanding. First, despite available prevalence estimates indicating that violent aggression is not common, many studies have focused on violent, extreme forms of driver aggression that do not appear to be representative of the experiences of most motorists who are concerned about driver aggression. Non-violent behaviours such as horn-honking, tailgating and obscene gestures are reported to be more widespread, yet have received comparatively little attention in the literature, and are often studied using definitions that group these behaviours with both violent aggression and risky behaviours. Consequently, gaps exist in current understanding of non-violent driver aggression. Non-violent driver aggression, although not inherently dangerous in isolation, is important to understand as it holds the potential to escalate into serious and potentially violent aggression, should the initial aggressive behaviour be retaliated to with a similarly aggressive behaviour. Certainly, preliminary research indicates that aggression is indeed responded to in an "eye for an eye" manner, suggesting that drivers believe that aggressive behaviour is warranted in response to another driver's apparent deliberate attack, highlighting the potential for events to escalate.

Secondly, studies examining the impact of trait characteristics have also tended to overemphasise traits that predict driver aggression and overlooked traits that may be protective against it. The review recognised trait mindfulness could be a promising characteristic to investigate for its potential to thwart aggression, in light of evidence indicating that mindfulness decreases aggression by impeding anger rumination. To that end, trait anger rumination was also identified as an under-investigated trait characteristic that may contribute to driver aggression.

Third, despite the important role that cognitions play in determining behaviour, they have been largely neglected in the driver aggression community; consequently, knowledge of the underlying thought processes that motivate aggressive on-road behaviour is limited. The review demonstrates that cognitions such as beliefs and attitudes have an important influence on behaviour through their influence on schemas that are used to appraise and interpret stimuli. In an interactive social environment like driving, cognitive appraisals of an on-road event are critical to whether drivers determine that a response to the event is warranted, and whether that response is aggressive. Thus to advance understanding of driver aggression, a better understanding of the psychological processes involved in driver aggression is required to determine how cognitive appraisal processes influence the likelihood of aggression. Therefore, cognitive appraisal process and the beliefs that give rise to them represent a crucial gap in the literature, and present an important area of investigation.

Fourth, review has also identified substantial conceptual gaps pertaining to the definition and operationalisation of driver aggression. The absence of a widely accepted conceptual definition of driver aggression has resulted in considerable variation in the terminology used to describe the phenomenon and the behaviours used to operationalise it. Consequently, communication and comparison of scientific evidence is problematic, which hinders the replication and growth of the literature. These definitional issues echo those experienced in early general human aggression research, which now notes intentions to harm and negative emotions as crucial to defining aggression, as they draw attention to the motivation underlying the behaviour. Further, these definitional issues appear to be a symptom of a wider limitation: the absence of a strong theoretical framework guiding the study of driver aggression.

As has been noted previously, Glendon (2011) has referred to the atheoretical nature of much of the literature within traffic psychology. Although it is acknowledged that data are needed before theory may begin to be meaningfully constructed, it is important for theoretical development to occur so as to move understanding beyond merely describing a behaviour to being able to explain and predict why the behaviour occurs. In line with this suggestion, gaps have been identified in the preceding review pertaining to the theory (or lack thereof) employed to understand driver aggression. In particular, driver aggression research has

neglected to adopt theoretical advances in the psychological approach to understanding human aggression and apply them to the driving context. Shinar's (1998) frustration-aggression model of driver aggression relies on a dated theory of human aggression which presents limited capacity to account for the perception and appraisal processes that are fundamental to aggressive driving behaviour. To enhance understanding of driver aggression and bring uniformity to the research, a holistic theoretical approach that incorporates the influence of dispositional, situational and psychological factors must be adopted.

The GAM, through its focus on interactions between person-related, situational and cognitive variables, offers strong potential to account for aggression in the driving context. A holistic theoretical approach has the capacity to advance current understanding of the underlying causes of driver aggression, by identifying cognitive and emotional appraisal processes that influence and maintain it. Therefore, the current research seeks to apply concepts from the GAM to the driving context, in order to explore the utility of a theoretical model based on the GAM to understand driver aggression. Thus the proposed model of driver aggression expands upon and enhances Shinar's frustration-aggression approach by drawing on a more recent model of human aggression with a plethora of supporting evidence. The proposed model is depicted in Figure 2.6 below.

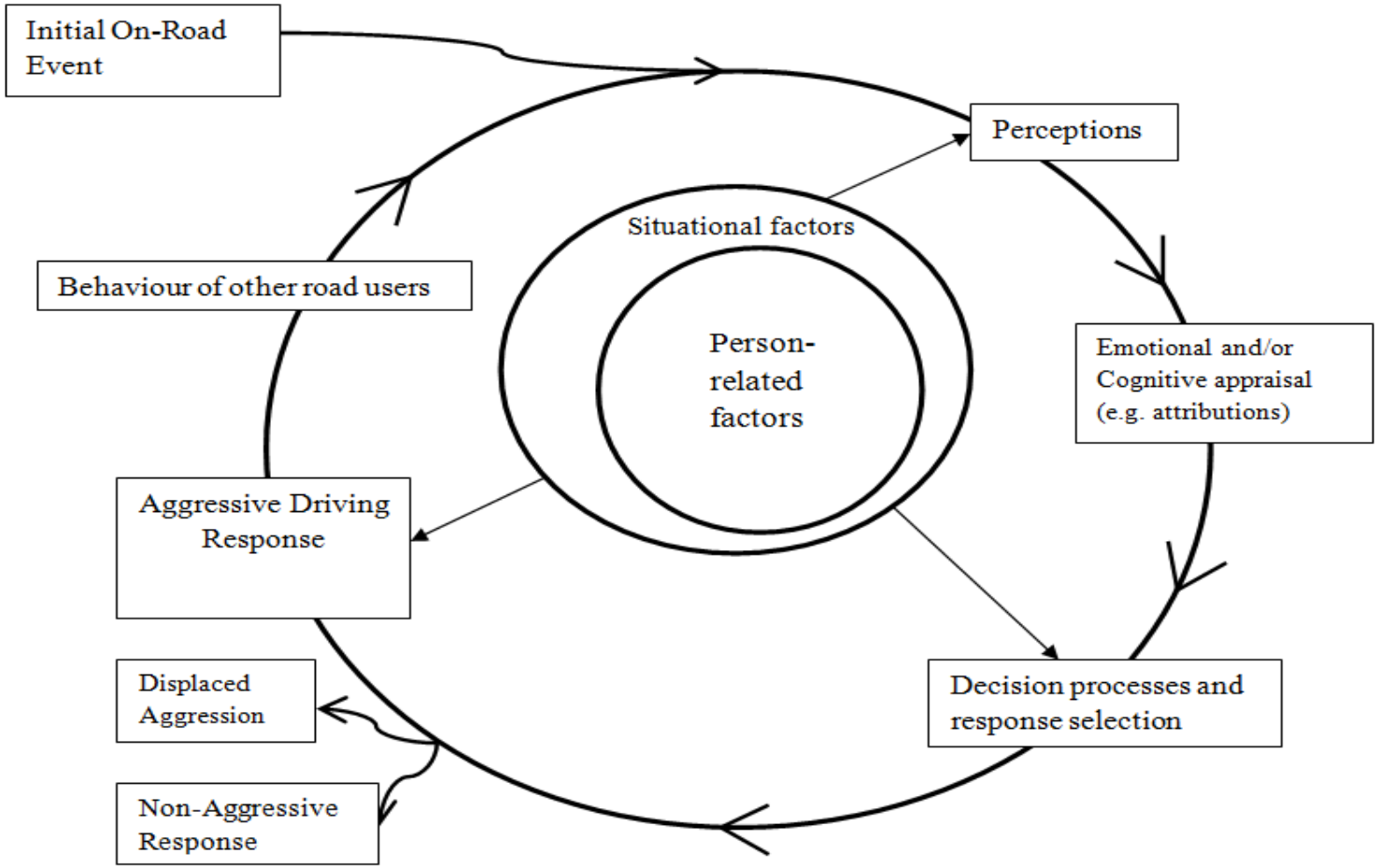

Figure 2.6.Proposed model of driver aggression

As described, a limitation of Shinar's frustration-aggression approach to driver aggression is that it cannot account for the potential for aggressive driving events to escalate. Accordingly, the proposed model is cyclical in nature to capture the potential for driving events to escalate, as well as mirror the GAM.

The proposed model begins with an initial on-road event (e.g., being cut off by another vehicle). The cut-off driver's perceptions of this event will be influenced by person-related factors such as their age, gender and enduring personality characteristics (e.g., trait anger, hostility, mindfulness), as well as situational factors such as the cut-off driver's current mood, time pressure and anonymity. While person-related and situational factors are accounted for in Shinar's model, the proposed model builds upon Shinar's approach, by incorporating cognitions and appraisal processes. To illustrate, the cut-off driver's perceptions of the event will also be influenced by their beliefs and attitudes about the driving environment. Along with the ongoing influence of their personality traits, these perceptions of the event will then be appraised by the cut-off motorist, resulting in the generation of an emotional response (e.g., anger, frustration, or anxiety) and an attribution regarding the cause of the event. Based on this appraisal, and the continuing effect of person-related and situational factors, a decision regarding an appropriate behavioural response will be made. Specifically, the driver may choose a non-aggressive response, which may result in displaced aggression. Alternatively, the driver may adopt an aggressive behavioural response. What determines whether the behavioural response is considered aggressive or non-aggressive depends on the driver's motivations for the behaviour: if the response is intended to cause some degree of harm to the target driver; psychological harm in the form of negative feedback, or ridicule, or physical harm, the response could be regarded as aggressive. Thus the proposed model addresses another limitation of Shinar's model: because Shinar's approach does not incorporate cognitions, it does not account for motives underlying the behaviour. To that end, Shinar's model distinguishes between hostile and instrumental aggression, which Bushman and Anderson (2001) argue is an outdated concept due to its limitations in accounting for several motivations for the one behaviour. Accordingly, the proposed model does not differentiate between hostile and instrumental aggression, and instead, focuses on the underlying motives for the behaviour based their intention to harm the target driver.

Following an aggressive response by the driver who was cut off (e.g., making a rude gesture), the target driver may choose to not respond, essentially ending the cycle. Alternatively, the target driver may engage in their own aggressive response in retaliation, leading to the initial event escalating and a new on-road event for the cut-off driver, and the cycle repeating itself.

2.13. Research aims and questions

The aim of the current research is to investigate cognitions involved in non-violent driver aggression with a view to informing the further development and refinement of a proposed theoretical model for understanding it based on the GAM. In doing so, the proposed model will be informed by both driver's beliefs, attitudes and perceptions of the road environment, as well as relevant theoretical perspectives. In order to lay the foundation for the model, the research will focus heavily on exploring the way the drivers conceptualise driver aggression and the road environment, as these factors as currently under investigated. Without an enriched understanding of the role of cognition in driver aggression, the utility of the model cannot adequately be determined.

The model will be contextualised and investigated through a series of three studies. It must be noted that at this exploratory phase of research examining the proposed model that only specific constructs of it, specifically, constructs identified as having substantial gaps in knowledge will be investigated. As will be highlighted shortly, these constructs have been identified as person-related factors (particularly protective factors), cognitive factors and behavioural response. Furthermore, although the research will be alert to and will carefully consider any results that may provide insight regarding the cognitions involved in escalation, the cyclical aspect of the model will not be directly explored in the current program of research. Rather, the studies comprising the program of research aim to:

- Explore drivers beliefs and the cognitive appraisal processes underpinning aggressive and non-aggressive responses to on-road events
- Identify and describe the range of on-road events that associated with anger and aggression on the road, and why these events are regarded as provocations;
- Explore the purposes of different aggressive driving responses and their cognitive antecedents; and
- Investigate the influence of both risk and protective person-related factors on driver aggression.

In doing so, the program of research seeks to address the four key research questions described below. These research questions are designed to explore gaps in knowledge identified in the preceding review as they pertain to stages reflecting the key constructs of the proposed model under investigation in the program of research. These research questions and their relationship to the model are illustrated in Figure 2.7.

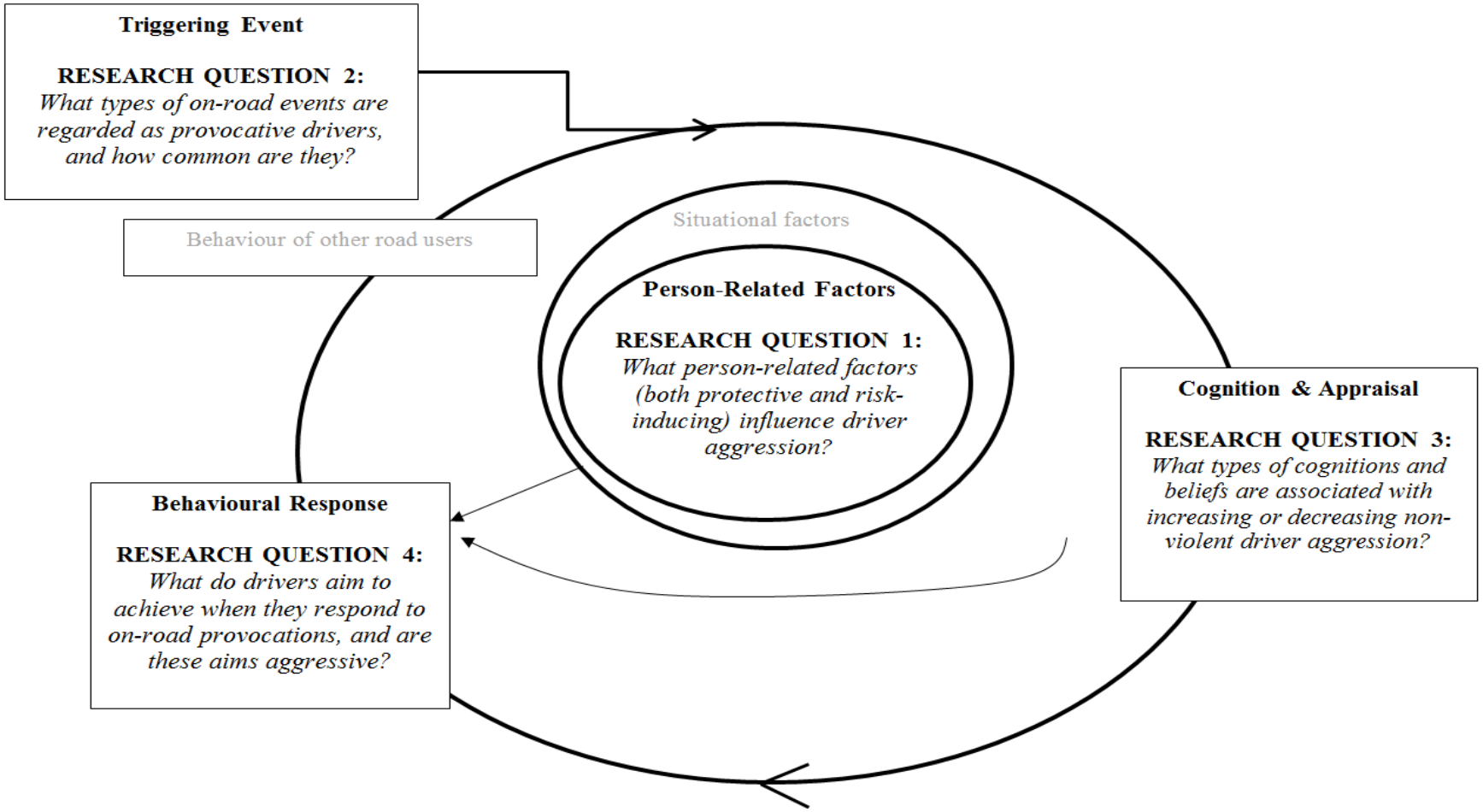

Figure 2.7. Research questions as they pertain to the key stages of the proposed model

Research Question 1*: What person-related factors (both protective and risk-inducing) influence driver aggression?*

As described in the preceding review, person-related factors with the potential to increase driver aggression have been widely investigated in the literature. Evidence demonstrates that trait anger and trait hostility are positively correlated with driver aggression. However, the review also identified trait anger rumination has been largely neglected in driver aggression research, yet has a robust body of evidence demonstrating a positive effect on aggression in other context. Specifically, it is suggested that anger rumination effects aggression by focusing attention towards angry or hostile cognitions and intensifying them. As such, anger rumination represents a promising avenue of investigation to enhance understanding of driver aggression.

Understandably, considerable research has focused on identifying factors that predict a greater likelihood of driver aggression; however, a more complete understanding of driver aggression can be obtained by also understanding what factors inhibit the likelihood of it. Mindfulness represents one enduring trait characteristic that will be investigated for its potential to protect against driver aggression, in light of evidence demonstrating its potential to thwart aggression by impeding rumination. The role of both person-related risk and protective factors on driver aggression will be investigated in the final study of the program of research, which will conduct a preliminary investigation of the utility of the proposed model.

Further, give that person-related factors are likely to influence the way the people interpret and perceive events in their driving environment, the final study will also explore potential relationships between the person-related and cognitive factors, to identify potential relationships that should be explored for their interactive effect on driver aggression. It must be noted, however, that in keeping with the scope demarcated in Chapter 1, the final study will not explicitly investigate the interactive effect of these relationships on driver aggression; it will simply establish which relationships have the potential to be explored further. Rather, the final study will focus on exploring what each key construct of the model can contribute towards explaining driver aggression.

Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*

The preceding review highlighted that despite the body of research examining what types of events trigger on-road aggression, there is a paucity of research that has explored the underlying reasons why these events are regarded as provocative by drivers. Findings from studies have shown that behaviours such as tailgating, flashing lights, speeding and cutting off are cited as some of the most commonly reported provocations. However, many of these studies are based on analysis of secondary sources, and of relevance to the current research, appear to rely on assumptions regarding why drivers consider these events to be provocations. These assumptions then subsequently underlie any conclusions drawn about drivers' motivations for their aggressive behaviour. For instance, cutting off behaviours are presumed to trigger driver aggression because another driver has suddenly encroached on safe braking distance, creating a dangerous situation: an inherent consequence of this assumption is that the driver's aggressive response to the cutting off behaviour stems from the fear or threat imposed by the dangerous situation. While this is certainly a plausible account, there may also be alternative explanations.

To properly investigate the role of cognition in the context of the model and enhance understanding of why driver aggression occurs, it is important that the investigation be informed by an understanding of both what behaviours trigger aggression and why they are regarded as provocations. Accordingly, the first two studies of the program of research will be qualitative investigations where drivers will report on real-life negative driving events they experience. Drivers will describe a provocative event that they recently experienced, and provide their thoughts and feelings about it, as well as describing the purpose of any response they made to it. Asking drivers to discuss what on-road events trigger anger and aggression will also allow for an indication of prevalence rates of events that drivers themselves describe as provocations to be established. The information gained from these qualitative investigations will then be used in the final study, which will apply it towards exploring how well the model can account for driver aggression.

Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*

This research question is intended to complement the second research question. In order to achieve a comprehensive understanding of the role of cognition in driver aggression, not only must an understanding of why particular events trigger driver aggression be achieved, the beliefs that affect the way situations are perceived must be determined. By better understanding drivers' beliefs, which are likely to influence how they perceive the driving environment, an enhanced understanding of the purpose of drivers' responses to provocative events can be gained. Early available evidence indicates that holding a negative aggregate view of other drivers can increase aggression. However, little is known about what these negative beliefs are; specifically, little is known about what people believe about the driving environment that informs their perceptions of on road events. This is important to consider because a large number of drivers appear to consider their own aggression as warranted. Furthermore, for the model to be effective, it should be able to explain both circumstances that will give rise to driver aggression, and those that will be inhibited. As such, it is important to consider those beliefs that will decrease the likelihood of aggression, as well as those that will increase it.

This research question will be addressed in all three studies comprising the program of research. The first two studies will adopt qualitative techniques to help identify some common thoughts that drivers report and shared ways that drivers appear to conceptualise the driving environment in ways that influence aggression. The final study will use the knowledge gained in by the qualitative investigations and apply it towards exploring what it can contribute towards understanding aggressive and non-aggressive responses to provocative on-road events in an exploration of the model.

Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

The final research question pertains to the component of the model that reflects drivers' behavioural response. It is intended to explore what behaviours drivers engage in response to on-road provocations, and explore the purpose of their behavioural response, with a view to determining if drivers' behaviour reflects aggressive intentions. As the preceding review highlights, there has been a tendency

to consider driver aggression in a somewhat circular fashion by defining it in terms of a list of behaviours that are considered aggressive, and assuming that these behaviour are performed with aggressive intentions. However, studies adopting this approach to defining driver aggression have tended to yield mixed, conflicting results, which have hampered understanding of why driver aggression occurs. Alternatively, focusing on purpose of behavioural responses will help to elucidate non-aggressive responses from aggressive responses by distinguishing behaviour that was intended to harm (i.e., aggressive) from behaviour that was not intended to hurt another motorist (i.e., non-aggressive).

The qualitative studies will explore the purposes of driver's responses to negative on-road events, focusing on investigating various ways that drivers respond to on-road events, and how they describe the purpose of their behaviour, to explore whether it reflects aggressive intentions. The information gained from these qualitative studies will then be used in the final study, to determine how the cognitive factors identified in them influence both aggressive and non-aggressive intent in a preliminary investigation of the model.

2.14. Chapter summary

The above chapter has provided an overview of the relevant theoretical and empirical literature that informed the development of the current program of research. It described a number of issues that have hampered investigation into driver aggression, and highlighted the complexity of research into driver aggression. It called attention to a bias in the literature towards examining risk factors of driver aggression at the expense of exploring potential protective factors, and emphasised the paucity of research exiting the role of cognition in driver aggression. The chapter also identified issues relating to the definition and operationalisation of driver aggression, as well as gaps pertaining to the theories that have been applied to understanding the phenomenon. To help advance research towards a more complete understanding of driver aggression, a holistic model for understanding driver aggression based on the GAM that incorporates the influence of person-related, situational and cognitive factors was proposed. The chapter concluded by delineating the aims of the program of research, and the research questions it seeks to address to explore the proposed model. The ensuing chapter will document the first study in the program of research, a large-scale qualitative investigation that seeks to address gaps

in the literature pertaining to cognitions in driver aggression, by exploring Australian drivers' experiences with and perceptions of driver aggression.

Chapter 3: A diary-based investigation of driver aggression

3.1. Introductory comments

The following chapter details the first study in the program of research, a comprehensive qualitative investigation into South East Queensland drivers' experiences with and conceptualisations of driver aggression. As the preceding chapter highlighted, the driving environment is fundamentally a social interaction, requiring large numbers of road users to interact, interpret and appraise other motorists' behaviour. As reflected in the GAM, the internal processes that guide how events in one's environment are interpreted and appraised are an important determinant of subsequent behaviour. Thus, in the driving environment, it is argued that drivers will behave according to their perceptions and interpretations of on-road events. Therefore, knowledge of these processes and the beliefs that guide them is considered crucial to understanding the underlying causes of driver aggression.

Research investigating the psychological processes involved in driving behaviour is still in its infancy. As such, knowledge of these processes in the driving context and their influence on aggression is currently limited. Further research is required to identify beliefs and attitudes involved in driver aggression to understand how they influence appraisals that both give rise to driver aggression and protect against it. Accordingly, the current study adopted qualitative techniques to learn about drivers' experiences with, and thoughts about, driver aggression in order to explore the cognitions and cognitive processes involved in the phenomenon from the perspective of the drivers' themselves. In doing so, it was possible to gain insight into these processes, thus providing a solid foundation for the remainder of the research and a basis to contextualise the model.

3.2. Purpose of study

The purpose of the first study was twofold: to assist in contextualising the model by addressing gaps in knowledge concerning cognitions and cognitive processes in driver aggression, and to provide a foundation for the remainder of the program of research to conduct a preliminary investigation of the proposed model. For the current study, it was considered crucial to generate new knowledge and elucidate any additional aspects that may need to be included in the model. Thus

qualitative techniques were used to develop an understanding of cognition in the driving context, as reported by drivers themselves.

3.3. Study aims

Rather than testing specific hypotheses, the study was exploratory in nature. It aimed to identify the types of events that drivers regard as provocations, and consider the underlying reasons why these events are considered to be provocative. Additionally, the study aimed to identify beliefs about and attitudes to the driving environment, and how they may influence drivers' interpretation and appraisal of events that can result in aggression. In doing so, the research was directed toward gaining an appreciation of the purpose of drivers' responses to provocations, to determine if they reflect aggressive intentions. As the aim of the study was to explore influential factors rather than predict them, it was anticipated that the knowledge gained from the study would provide information that would assist in addressing the following research questions described in Chapter 2:

- Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*
- Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*
- Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

To help generate knowledge that would contribute to these research questions, the following lines of enquiry were explored in this study:

- The types of on-road behaviours or events that drivers report as negative events;
- The reasons why drivers describe these events as negative;
- Drivers' thoughts regarding the cause of the event;
- How drivers describe the purpose of their response (either aggressive or non-aggressive) to the event; and
- Factors or processes that may be involved in escalation of aggressive driving events.

3.4. Design

While the predominant methodology in most driver aggression research appears to be scenario-based studies where drivers respond to questions regarding hypothetical on-road provocations, these methods are prone to social desirability biases, present limitations relating to the external validity of responses, and are not effective in generating new knowledge (Mitchell & Jolley, 2012). Thus, taking into consideration the aims of the study, qualitative techniques were selected as the most appropriate method to explore drivers' real-life experiences with, and perceptions of driver aggression.

As recognised in the literature review, driver aggression research is hampered by issues of social desirability stemming from impression management and a high opinion of one's own driving skills (af Wåhlberg et al., 2010; Lajunen et al., 1998a). Traditional qualitative techniques such as interviews and focus groups, while allowing for exploration of internal thought processes, provide an environment where these biases can flourish: they are subject to demand characteristics imposed by the interviewer and/or other focus group members (Aronson, Ellsworth, Carlsmith, & Gonzales, 1990; Kvale, 1996). Therefore, responses may not be true and honest reflections, particularly when the subject matter requires discussion of issues like aggression that may present participants in a less than favourable light. Furthermore, these techniques often require participants to reflect on events in their driving history that may have occurred some time previously, thus their accounts are likely to contain errors in recall (af Wåhlberg et al., 2010; Kvale, 1996). Moreover, in the case of driver aggression, the events reported may be more extreme events that, although more salient in memory, are not necessarily typical of that driver's more common experiences with driver aggression.

Despite presenting a number of advantages, diaries where participants document their thoughts and feelings about a topic are an under-utilised method in driver aggression research. A search of the literature identified two previous studies that employed diary-based methods: a study by Underwood (1999) that used verbal driver diaries to study relationships between driving anger and stress, and a recent study by Wickens (2009) that used online diaries to study the role of attribution in driver aggression using a sample of Canadian drivers. In Wickens's study, drivers submitted four online diaries over the course of eight days, where they briefly

described the most negative event they had experienced in the past 48 hours of driving, including where it happened, their feelings about it and how they responded to it. Drivers also rated how negatively they regarded the event, the level of anger they experienced, and the extent to which they considered it to be a severe event. At the end of the eight days, participants completed an extended questionnaire about the event they had rated as the most negative one in the previous diaries. Drivers re-described the event and completed measures assessing various dimensions of their attribution for the event based on Weiner's (2006) extended attribution theory (e.g., causality, locus of control).

After careful consideration of the advantages and disadvantages of each qualitative method with respect to the aims of the study, it was evident that driver diaries appear to present many advantages. First, asking drivers to report on recent events means that drivers provide real-world data about their recent, real-world experiences in a short timeframe. Second, it was thought that hosting the driver diaries online would provide participants with a sense of anonymity which, as described in section 1.2, has been found to be associated with decreases in social desirability responding: given that participants would never personally meet the researcher or other research participants (Gwet, 2008; Silke, 2003; Taylor et al., 1991). As a result, participant responses may be less likely to be influenced by the presence of others, which may potentially reduce the influence of demand characteristics and social desirability in responses. Third, administering the diaries online offers practical advantages: they are easy to distribute to a large number of people and less demanding for participants than completing hand-written diaries.

Nevertheless, some disadvantages of the study's approaches are recognised, such as a sampling bias introduced given that the diaries were to be completed online. The use of an online data collection tool would reduce the likelihood that individuals without access to the internet could participate. That limitation notwithstanding, according to the Australian Bureau of Statistics (2016), internet access is high in Australia with 86% of households having access to the internet. As such, while the reliance upon online data collection should be acknowledged, the extent of internet access in Australia would suggest that the impact of sampling bias due to lack of access to the internet (and thus the online diaries) is likely to have been minimal.

In accordance with Wickens's study, it was determined that a series of structured driver diaries administered online, over one week of regular driving would be the most appropriate method for the current study. Additionally, given that the interest of both the current study and Wickens's study was cognition in driver aggression, Wickens's diary was used as a basis to inform the development of the current diary.

Similar to Wickens's approach, drivers completed a diary every 48 hours over approximately one week of regular driving, which was considered a suitable period of time to enhance accuracy of recall. Thus every two days, participants recorded their thoughts and behaviour in response to perceived provocations they had experienced while driving in the past 48 hours. This process resulted in three diaries completed over almost one week of regular driving. It was expected that completing multiple diaries over three time points would be advantageous, as it would allow for balancing out of the effect of undue influence of a particularly aggressive incident, or a particularly negative mood, which might not reflect a driver's general everyday experiences or moods. However, to increase the scope of information provided about the events drivers reported, which were anticipated to vary in severity, drivers in the current study provided detailed information about each of the negative events they reported over the week, rather than detailing only one event they regarded as the most negative.

The questions used in the current diary (provided in Table 3.1) modified and extended on the diary questions used by Wickens's, in order to augment the depth of information provided by drivers'. In particular, four additional questions were used in the current diary. First, drivers were asked to indicate how many negative events they had experienced in the past two days of driving, before providing in-depth information about the one they considered the most negative. This question was included to gain an insight into the perceived prevalence of negative events that drivers encounter. Second, drivers were asked to describe why they regarded the event they chose to report on as the most negative one they experienced to explore the reasons why particular events are regarded as negative. Third, drivers also described the reasons why they responded in the way they did and how their response made them feel. This question was included to explore the aim, or purpose of drivers' responses and to determine whether the described intentions appeared to be aggressive (as defined by the current research). Fourth, drivers were asked to

describe any responses they thought about but refrained from doing, to gain insight into the gamut of responses drivers may consider engaging in.

All diary questions where drivers were asked to describe their thoughts and feelings were open-ended in order to facilitate opportunities for drivers to provide the information that they believed was relevant. The questions were piloted with a convenience sample of 18 of the author's colleagues and acquaintances to ensure they were clear and generated appropriate responses.

Table 3.1.Diary questions and their respective constructs of the proposed model of driver aggression.

Stage of model	Diary Question
Triggering event	• Thinking about the past two days of driving, how many negative driving interactions have you experienced? • Think about the most negative interaction you experienced on the road in the past 48 hours. Please briefly describe what happened
Perceptions	• Of all the interactions you experienced, why do you regard this one as the most negative?
Situational Factors	• What was happening prior to this interaction occurring? Think about how you were feeling as you were driving before this event happened. What was your mood like? What was the purpose of your trip? Were you experiencing any time pressure?

Emotional and Cognitive Appraisal	• Of all the interactions you experienced, why do you regard this one as the most negative?
	• What emotions do you recall experiencing when this interaction occurred? (More than one may apply). Which one did you experience the strongest?
	• What were the very first initial thoughts or key words that went through your mind when this interaction first occurred?
	• Why do you think this interaction happened? That is, what do you think caused it?
	• If the interaction you've reported involves another driver's behaviour:
	  ◦ Did you think the other driver's behaviour was deliberate?
	  ◦ Do you think the other person intended their behaviour to have the effect on you that you experienced?

Behavioural Response	• What did you do in response to this interaction? Please briefly describe why you think you responded in this way? How did you feel after responding this way? • Think of a time when you've experienced a similar event to the one you've just reported. Did you react in a similar way? • What other responses (if any) did you consider or think about?

3.5. Approach to the data

Qualitative methods focus on understanding meaning; however, numerous approaches to gaining an understanding of meaning are apparent in the literature (for a review, see both Denzin & Lincoln, 2008; Nagy Hesse-Biber & Leavy, 2006). The current study embraced an interpretive epistemological approach, which are increasingly more common in the social sciences than traditional positivist approaches (Sandberg, 2005). A positivist epistemology maintains that "there is a knowable reality that exists independently of the research process, and it can be discovered and tested through objective means and a neutral researcher" (Nagy Hesse-Biber & Leavy, 2006 pg.38). Thus two key assumptions underpin a positivist approach. First, it is assumed that objective facts or truths exist and that they can be uncovered by research conducted within the scientific method. Second, positivist approaches conceptualised the research and the researcher as separate entities in the research process, and thus assume that the researcher has no bearing on research outcomes because. Positivist approaches are generally focused on quantifying data to identify trends and make predictions, employing a deductive approach to analysis, where theories are tested by following hypothesis testing procedures.

In contrast, an interpretive approach is embedded in phenomenology, which emphasises an inextricable relationship between an individual and his or her lived experience of the world (Golden-Biddle & Locke, 2007). A central tenet underpinning interpretive approaches is that social meaning is created during interaction with the social world. Hence, an interpretive approach is concerned with the interpretation that individuals assign to their interactions, recognising that interpretations are fluid both between and within people (Patton, 1990). The goal of research conducted within an interpretive framework is to identify similarities and common interpretations of everyday experiences to generate an understanding of shared lived experiences. Interpretive approaches are considered useful when exploring previously unexplored questions, because theory is inductively generated from the data itself using techniques similar to the constant comparative analysis found in grounded theory (Willis, Jost, & Nilakanta, 2007).

The constant comparative method facilitates the generation of conceptual categories or themes that relate to the phenomenon of interest and uses coding to organise data (Boeije, 2002; Glaser & Strauss, 1965a, 2009). Coding is a general

term used to describe the way qualitative data is arranged and categorised in order to make sense of qualitative data in an organised, systematic way (Bergman & Coxon, 2005; Boeije, 2002; Glaser & Strauss, 1965a, 2009). In the process of coding, the researcher finds similarities in pieces of text and uses them to form categories, assigns that category a name and then labels the responses as falling into that category, thus allowing large amounts of data to be summarised and integrated to describe patterns that exist within them. The total set of codes used to code a set of qualitative data becomes refined during the analysis process as the researcher become more familiar with the data. The final set of codes that emerges is typically described as a "coding frame" which represents how qualitative data become themes. Using the constant comparative method, codes are compared to one another on an ongoing basis as the data is analysed in order to identify how the codes are similar or different from one another; that is, they are constantly being compared and contrasted (Glaser & Strauss, 1965a).

Based on the aims of the program of research and the current study, an interpretive approach was considered appropriate to guide the research process for two key reasons. First, the current study was exploratory, seeking to fill gaps in knowledge regarding the cognitive processes in driver aggression. As it was the intention to use the information derived from this study to contextualise the model, it was considered crucial that the methods employed in the study generate new knowledge and understanding of drivers' lived experiences of driver aggression. Second, interpretive approaches are used to investigate how individuals make sense of everyday experiences, which mirrors the current study's emphasis on understanding ways in which drivers interpret events in their driving environment that may give rise to aggressive behaviour.

However, while it must be noted that interpretive approaches are typically synonymous with inductive approaches to analysis, Bauer (2000) highlights that no approach can be exclusively inductive, as the research process will be informed by the researcher's pre-existing knowledge and goals of the study. As the aim of the program of research is to explore the utility of the GAM in the driving context, it is acknowledged that a theoretical perspective underpins the research and therefore, the approach cannot be considered purely inductive. While the study is consistent with an interpretive approach in that it investigated a previously under-explored and poorly understood area, and adopted the iterative process described by the constant

comparative method to generate themes, the research was also guided by the theoretical perspective espoused in the GAM. Thus the study used deduction as much as it used induction.

3.5.1. The stance of the researcher: acknowledging and dealing with personal biases within an interpretive approach

The interpretive approach considers the researcher to be a part of the research process, appreciating that interpretations of shared experiences are inextricably intertwined with the person who makes them (Nagy Hesse-Biber & Leavy, 2006; Smith, 2004). As such, the role of the researcher (the author of the current thesis) and the measures adopted to minimise the bias that her own beliefs and experiences may have brought to the perceptions or interpretations within the research process will be described, to provide transparency regarding their influence.

First and foremost, it must be acknowledged that the author has her own lived experience with driving and aggression on the road, which may bias the perspective through which interpretations were made. The author is an experienced driver from the same population under investigation, has held a driver's licence for over 15 years and has driven extensively during this time. In previous employment, the author was required to drive for work purposes during working hours in addition to commuting to and from work. Currently, the author drives at least once a day. Moreover, throughout her driving history and throughout the program of research, the author has witnessed aggressive behaviour while driving and had her own experiences of anger. Consequently it is recognised that the author has developed her own personal perceptions about driving and aggression on the road and that these experiences are likely to have emerged throughout the research process.

During data collection for this study, the author was required to commute one and a half hours each day to campus in peak hour traffic. Having previously resided quite close to campus, the author openly acknowledges that she found this long commute frustrating; however, in the context of the current research, it presented a unique opportunity to become more conscious of her own beliefs about driving, and the experience generated an awareness of how she personally conceptualises issues relating to driver aggression with respect to participant's descriptions of their experiences. Although diary responses were not being formally analysed while data was being collected, diary submissions were nevertheless reviewed on a daily basis to identify potential participants for a follow-up interview (see Chapter 4).

Remaining mindful of her own stance regarding negative or frustrating events helped her to avoid placing emphasis on diaries where a participant's account of the event they experienced reflected events she could identify with, or her own views. This awareness, along with the development of and adherence to a set of criteria for selecting interview participants helped to bring objectivity to the recruitment of interviewees.

Rather than seeking to confirm her own perspective, the author was able to use her experience of her own on-road frustrations during data collection to foster a greater appreciation of the need to remain sensitive to different thoughts and perspectives offered by participants during the analysis of diary responses (McPherson & Thorne, 2006). In order for the findings generated from the current analysis to be both meaningful and valuable to the later stages of the program of research, it was crucial that they not be a reflection of her personal views on driver aggression. Thus to minimise the influence these views may bring to the analysis, before commencing the analysis, the author engaged in personal reflection on her own beliefs and experiences with driving anger by considering how she might respond to the diary questions. This process helped to identify how her own experiences may influence the analysis, by highlighting what events she finds personally frustrating and the underlying reasons why. Specifically, this highlighted that the author personally becomes frustrated when experiencing several minor hold ups (e.g., encountering several red lights on a single road) in a single journey that end up resulting in a considerable delay. Thus the personal reflection created greater awareness that the author might, due to her own experiences, relate to certain events reported in the diaries, give them undue attention, and consequently project her own beliefs onto the further interpretation of the response.

After this exercise, the author commenced the analysis by coding diary responses to the question describing the triggering event, to help identify the range of events that participants reported, including those that may be different from her own. Bringing this into conscious awareness helped her to remain open to responses that did not mirror preconceived ideas or expectations. In fact, this process revealed that many of the provocations reported were different from the events the author personally identified as negative experiences. As such, the author was able to approach drivers' descriptions of the events they reported with greater openness;

understanding that these events are ones that many participants identified as important to them, despite not being of personal importance to the author.

As an additional measure to minimise the influence of personal biases, emerging themes in the thematic analysis were discussed with the supervisory team. The supervisory team challenged the interpretations being made by offering alternative perspectives to the emerging one presented by the author. In doing so, the author was forced to present evidence from the diaries to support the interpretations she had made, to explain why a piece of text supported patterns observed in diary responses, and to consider alternative interpretations where evidence supporting interpretations was found to be lacking on closer examination. This allowed for the emergent themes to be repeatedly challenged and helped to keep the author alert to the various perspectives offered by participant drivers. Finally, while time and budgetary constraints prevented an independent judge being recruited to assist with the thematic analysis, an independent coder who was blind to the aims of the program of research and who had minimal existing knowledge of driver aggression research was available to provide inter-rater reliability for the content analysis (see section 3.6.4.2). Although these measures to reduce bias were taken in the attempt to bring greater objectivity to the research process, it is recognised that it is not possible to completely remove the influence of personal bias and/or beliefs in the research process.

3.6. Method

3.6.1. Participants

Participants were recruited from South East Queensland between August 2012 and March 2013. Recruitment and data collection ceased from mid-December 2012 until late January 2013 to coincide with the Christmas, New Year and Australian summer school holidays, as it was recognised that these periods are atypical times of year, often associated with increased traffic congestion and stress, both on and off the road, and thus less likely to be representative of drivers' typical experiences. Eligibility criteria included: residing in Queensland, having reliable access to the internet, holding a current driver's licence and driving at least once every 48 hours.

Two recruitment strategies were adopted to capture a large sample of drivers. Firstly, quarter-page colour advertisements were placed in local newspapers in five

major local government areas in South East Queensland: Brisbane, Logan, Moreton Bay, Ipswich, and Gold Coast. A list of these publications, their average readership, as well as the dates the advertisement was published is provided in Table 3.2. Rather than advertise as a study about driver aggression, which presents the potential for bias stemming from priming and social desirability influences, the study was described as an investigation into the communication processes involved in on-road misunderstandings and conflicts. A brief description of the procedure, eligibility criteria, and contact details of the principal researcher were provided, and interested drivers were instructed to contact the principal researcher.

Additionally, a series of emails advertising the study were distributed to a mailing list at Queensland University of Technology (QUT) with over 1800 subscribers. Recipients were invited to forward and share the email with their own contacts, resulting in a snowball sample. Collectively, these strategies resulted in 232 participants consenting to participate. From this sample, 24 participants formally withdrew from the study, failed to complete all the materials, or did not meet the eligibility criteria. Consequently, the final sample consisted of 202 participants, 74 males and 134 female, ranging from 18-83 years old (M = 40.48; SD = 13.55). Participants were provided with a $25 gift voucher upon completion of all materials in acknowledgement of the ongoing time commitment required to complete the study.

Table 3.2. Local newspapers publishing the recruitment advertisement.

Name of paper	Readership	Advertisement appeared
Northern Times	108 000	November 9 2012
Northside Chronicle	106 000	November 14 2012
Albert and Logan News	105 000	November 14 2012
North-West News	73 000	January 9 2013
Southern Star	83 000	January 16 2013
South-East Advertiser	72 000	February 27 2013
Westside News	67 000	February 27 2013
Queensland Times	51 000	March 6 2013

3.6.2. Materials and measures

3.6.2.1. General Demographics and Driving History.

Demographic information, including age, gender, education, and employment status was collected, as well as information pertaining to the length of licensure, the

main purpose of driving trips, and the average number of hours spent driving per week.

3.6.2.2. Driver Diaries

As described in section 3.4, a series of structured driving diaries administered over approximately one week of typical driving was used to investigate drivers' experiences with events that triggered anger, frustration, or annoyance and thus their experiences with events that could potentially result in aggression. Diary questions encouraged participants to reflect deeply on the events reported, and they were designed to direct participants towards describing their thoughts in response to the event, at each stage of the model.

3.6.3. Procedure

Ethical clearance was gained from QUT's Human Research Ethics Committee (Approval Number 1100001233). As will be described shortly, due to the ongoing nature of the study, some basic identifying information was required to allow participants to receive each successive diary. Consequently, participants were not completely anonymous during the data collection process. This raised the concern that although violent aggression was not the focus of the research, if such events were reported, participants could be identified and reported to the police where there was a legal requirement to do so. Therefore, explicit instructions were added to the diaries advising participants to not report such events, notifying them of the statutory obligation on researchers to disclose any serious criminal behaviour that participants reveal.

The process of this first study, from recruitment through to completion of the final diary, is depicted in Figure 3.1. During recruitment, interested participants were advised to make contact via email with the principal researcher, and a reply email containing a detailed description of what participation in the study would involve and a copy of the Participant Information Sheet was sent. Participants were asked to confirm their participation via return email after having read and considered all information provided. The researcher then provided drivers with a unique username and password to allow them personal access to the online diary. These details were sent to participants via email, along with a link to the first diary.

The first diary contained an electronic copy of the Participant Information Sheet, and participants were required to acknowledge that they had read all

information provided and understood what participation in the study would involve before continuing. Following this, key terms were defined and clarified for participants. In particular, participants were advised that the research was interested in "negative driving interactions" which, for the purpose of the research, should be considered "*any interaction with another driver on the road where you experienced (even fleetingly), any level of discomfort or negative emotion."* This phrase was chosen for several reasons. Firstly, it was chosen to prevent priming that may be associated with more emotive terms such as anger, frustration, or aggression. Secondly, reflecting the interest in cognition associated with non-violent aggression, it was anticipated that adopting the term "negative interaction" would encourage participants to reflect on a wider range of on-road events, even those that may have seemed mundane or trivial to them. To that end, the use of this definition, coupled with explicit instructions discouraging the reporting of violent behaviours was anticipated to steer participants towards reporting the types of events under consideration in the current research. Instructions finished by encouraging participants to consider events where they may have been an instigator as well as those where they were a recipient in an effort to obtain information about both roles. Each diary took approximately 30 minutes to complete.

Following the submission of each diary, participants received an automated notice informing them that a link to the subsequent diary would be sent via email in 48 hours. Participants who failed to complete their diary within 24 hours were sent a reminder, and were considered withdrawn if materials were not completed within the required timeframe of 48 hours. The final diary contained the demographic measures, presented after the diary entry had been completed. Participants were then thanked for their time and contacted by the researcher to arrange collection of their gift voucher. All identifying information was destroyed on dispatch of the gift voucher, leaving the data anonymous.

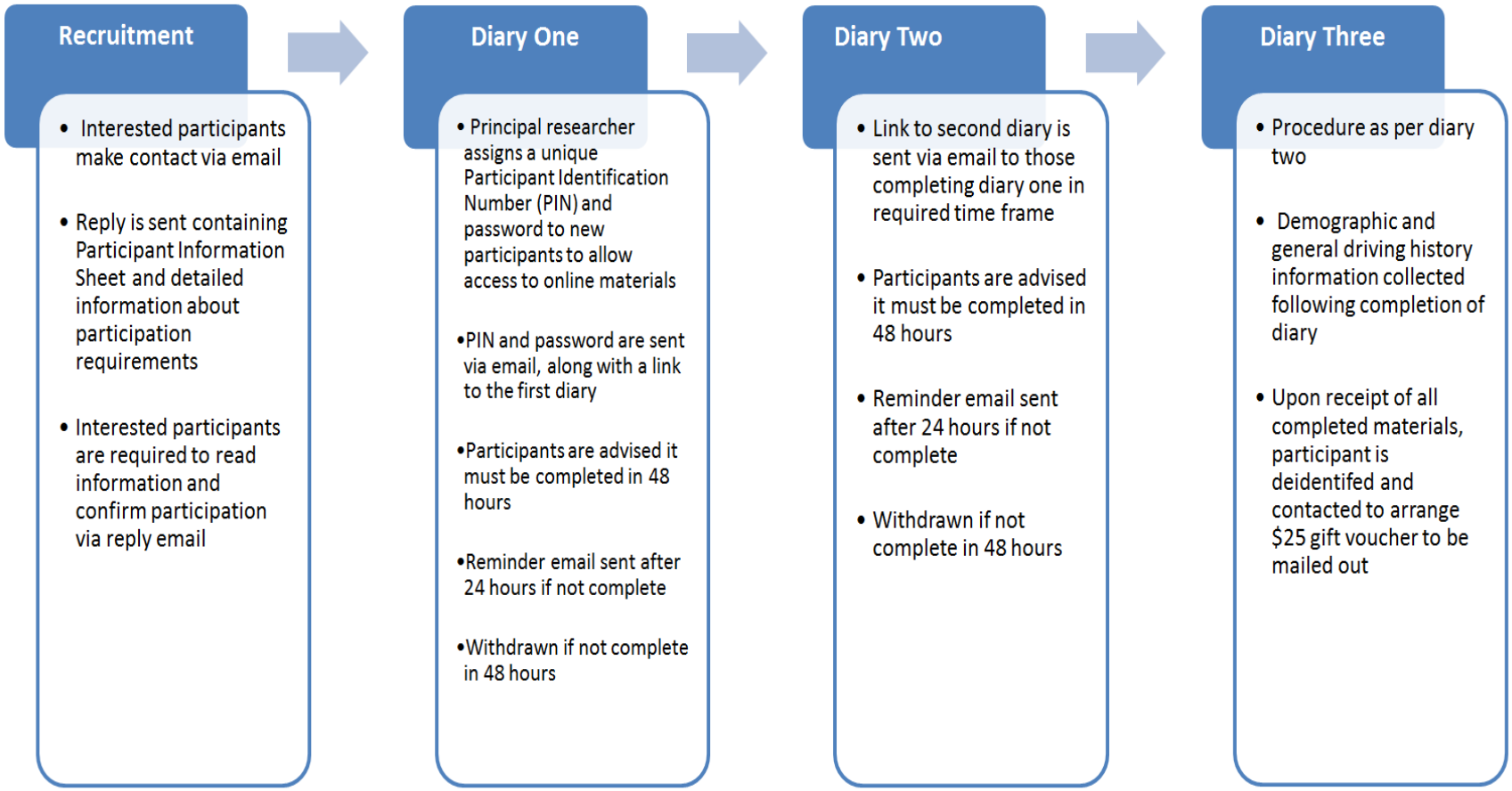

Figure 3.1. Outline of Study 1 Procedure

3.6.4. Overview of analyses

When the current study was being developed, it was anticipated that participants' responses to questions reflecting the key stages of the model would be collated, and a content analysis would be conducted on those responses. A content analysis is a qualitative technique that seeks to quantify descriptions of qualitative data and adopts the constant comparative method described above (see section 3.5) to code qualitative data to generate conceptual categories, and then uses the emergent coding frame to create a series of categorical variables to observe how frequently each code occurs (Elo & Kyngäs, 2008; Weber, 1990). Thus, while content analysis adopts the constant comparative approach to systematically derive meaning from qualitative data, its goal is to determine the frequency of how often the code is assigned to a piece of text (Bauer & Gaskell, 2000). Because of this goal, the coding frame developed for a content analysis must be very precise: codes must be exclusive, and each piece of data is assigned to only one code (Hsieh & Shannon, 2005). Based on these considerations, it was anticipated that a content analysis would be conducted to identify themes in responses to questions relating to the key stages of the model and, thus, identify what were the most frequent, or common, types of responses to these questions.

Although the content analysis was the original intention or aim of this phase of the research, while reviewing the diary entries to identify participants who could be suitable for an interview (see Chapter 4), it became apparent that some particularly insightful remarks were being provided. For instance, the finding of a theme relating to 'satisfaction and superiority' that is described further in section 3.11.3 is an example of a theme that was only apparent when considering all responses collectively. That is, when responses were collated as a function of a particular question for which they were offered, some interesting remarks (like those that eventually comprised the superiority theme) were lost. Thus, the emergence of this theme, which was unexpected and novel, drew attention to the need to reconsider the intended approach for the data analyses. Specifically, it highlighted that while a content analysis of responses diary question by diary question would have identified the most frequent responses at each key stage of the model, as a sole analytical technique, this approach would run the risk of losing meaningful and insightful information that did not necessarily relate to a specific question which was asked,

with such questions drafted to address specific aspects of the proposed model. Accordingly, in order to draw upon the full insights offered by the data recorded in the participants' responses, the decision was made to also conduct a thematic analysis so as to identify general themes that emerged throughout the diaries. This thematic analysis was to be a separate approach to the originally intended content analysis, the latter which sought to identify the frequency of responses as they related to specific parts of the model (and, thus, specific questions). A content analysis focuses on quantifying descriptions of qualitative data whereas thematic analysis uses coding processes to identify similarities in the data to generate meaning and subsequent themes (Bauer & Gaskell, 2000; Braun & Clarke, 2006). A more in-depth overview of each of these analyses will now be provided, followed by the findings that emerged from each of them.

3.6.4.1. Content analysis

As described above, a content analysis was conducted to identify the most common types of diary responses to questions representing the key constructs of the model: the triggering event; perceptions and beliefs regarding why the reported event was considered negative; the automatic, initial thoughts in response to the event; attributions regarding its cause; and the behavioural response to it.

Before the process of this analysis is described, some important points must be noted. First, it was anticipated that the content analyses would consider responses provided across all three diaries, collate them according to diary question, and thus examine responses as they pertained to each stage of the model. However, as will be described in section 3.7.2, there were significant differences in the number of events reported in each diary, with fewer events being reported with each successive diary. Although other possible explanations for this decrease will be considered in section 3.12.3, one possible reason is simply that participants became familiar with the diaries and/or became fatigued by the task. As such, the responses in the first diary, where the task was new and unfamiliar to participants, were considered the richest source of information and thus the analysis was only conducted on responses provided in the first diary.

Second, Bauer and Gaskell (2000) recommend that precision of the coding can be can be greatly enhanced by using two independent coders to code a dataset according the coding frame, and calculating the degree of consistency between them.

Consistent with this, it was recognised that having been deeply involved in the program of research, that the author may experience bias in the interpretation of responses, development of coding frame and assigning of codes to responses. Accordingly, an independent research assistant was employed to follow the same process that will be documented in the following section, to allow for inter-rater reliability. The research assistant was experienced in qualitative analysis but had limited prior knowledge of driver aggression research and was blind to the aims of the current program of research.

Table 3.1 (above) documents the diary questions and their relationship to each stage of the model. For the current analysis, responses to diary questions mapping onto the five key constructs of the model were of particular interest: the triggering event, perceptions and beliefs regarding why the reported event was considered negative, the initial thoughts in response to the event, attributions regarding its cause, and the behavioural response to it. This is depicted in Figure 3.2.

Consistent with this focus on specific aspects of how the driver diary material informed the constructs of the model, the content analysis process began by collating responses provided by all participants to each of the identified key questions. These collated responses were read twice as an ensemble to familiarise the author with the content. During the third reading, the author began making brief, tentative notes regarding the initial interpretation of the key points being conveyed in each response. This process served to identify patterns at each stage of the model by highlighting similarities and differences in responses to corresponding questions, and it generated a preliminary list of various responses provided to the same question.

Each item on this list was assigned a numeric code to represent it. The list was reviewed and refined with each subsequent read-through to ensure that the final list of codes that emerged could be applied to all responses provided to the relevant questions under analysis.

When the author and the research assistant each believed they had arrived at a complete preliminary coding frame for the diary question under analysis, they would meet to compare and discuss the frame that each had developed individually, with a view to arriving at a final coding frame. During these discussions, each would note any patterns or nuances they observed in analysing responses, discuss areas of disagreement, and ensure that areas where there was agreement shared similar interpretations. Through this process, amendments and clarifications were made to

each individual coding frame to arrive at a final, agreed-upon coding frame to code responses. Following this, the researchers each independently used the agreed-upon coding frame to code every response to the question under analysis. Inter-rater reliability values using Cohen's Kappa were calculated for this independent coding round, and the researcher and research assistant would subsequently meet again to discuss each individual instance where there was disagreement about the code assigned and endeavour to reach an agreement through discussion. Instances where agreement could not be reached were coded as 'other' and following the discussion, inter-rater reliability statistics were recalculated. This process was then repeated for each of the five key diary questions under consideration.

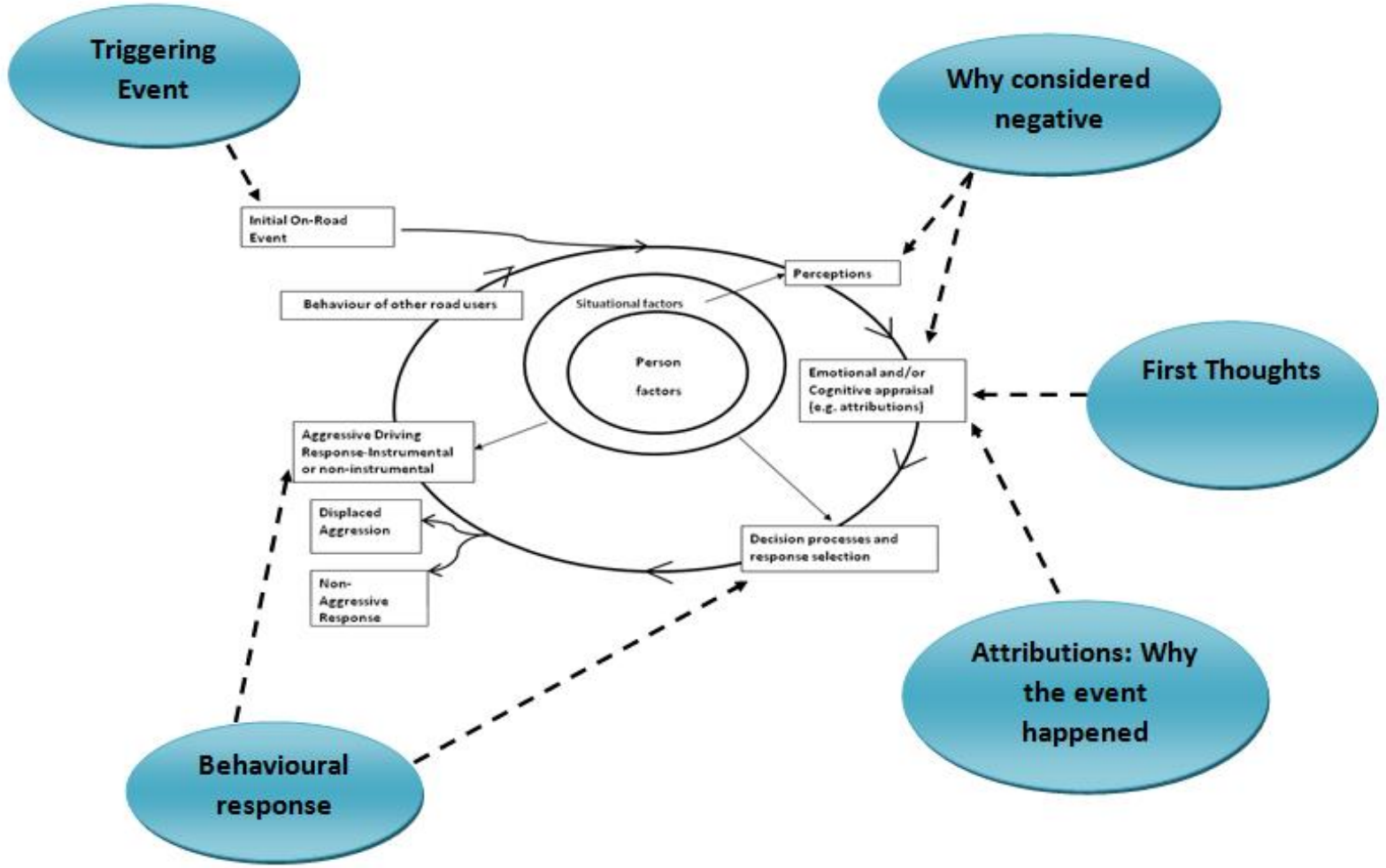

Figure 3.2. Components of the model under investigation in content analysis.

3.6.4.2. Thematic Analysis

To help derive meaning from the diary responses in a consistent manner, the thematic analysis was guided by the steps delineated by Braun and Clarke (2006). To do this, the researcher commenced the analysis by completing two initial readings of all diaries in their entirety to develop familiarity with the collective diary responses. Following this, initial coding began to reduce the data from a large number of individual responses to more general but meaningful categories of similar responses. Initial codes were subsequently reviewed and those referring to similar or overlapping aspects were grouped together and refined to form the themes that will be discussed below. As described in sections 3.5 and 3.5.1, an interpretive approach to the analyses was adopted, and as a measure to reduce the influence of personal biases exerting an undue influence on the results, all emergent themes were discussed and revised in consultation with the supervisory team.

Quotations taken directly from participant driver diaries are provided as evidence supporting the interpretations made in the current analysis. Drivers are identified by their gender and age (e.g., Female, 31). As these responses were provided online using a keyboard, numerous typing and spelling errors were apparent in responses. For the purpose of illustrating interpretations of responses in the thesis, every effort has been made to correct these errors.

3.7. Results

3.7.1. Sample Characteristics

Table 3.3 displays the demographic characteristics of the sample broken down by gender. The final sample consisted of 202 participants (65.3% female, 34.7% male) with an average age of 40.35years (*SD* = 13.69). The sample was well educated and the majority were employed full-time. Participants drove an average of 10 hours per week, mainly travelling to and from work, and most had over 20 years driving experience.

Table 3.3. Sample characteristics of drivers participating in diary study

Demographic	**Total Sample** (***N*** **= 202)** (*M*/*SD*)		**Males** (***n***= **74)** (*M*/*SD*)		**Females** (***n*** **=134)** (*M*/*SD*)	
Age	40.35	(13.69)	43.90	(15.03)	38.50	(12.6)
Years with licence	22.20	(13.59)	25.94	(15.11)	20.24	(12.35)
Hours driven per week	9.84	(6.65)	10.95	(8.05)	9.25	(5.73)
Highest Education (*n*/%)						
University	112	(55.4)	38	(54.3)	74	(56.1)
TAFE or trade	45	(22.3)	19	(27.1)	26	(19.7)
Senior high school	28	(13.9)	7	(10.0)	21	(15.9)
Junior high school	11	(5.4)	3	(4.3)	8	(6.1)
Other	5	(2.5)	2	(2.3)	3	(2.3)
Employment Status (*n*/%)						
Full time	93	(46.0)	37	(52.9)	56	(42.4)
Part time/Casual	42	(20.8)	7	(10.0)	35	(26.5)
Self employed	7	(3.5)	5	(7.1)	2	(1.5)
Student	29	(14.4)	8	(11.4)	21	(15.9)
Unemployed	16	(7.9)	10	(14.3)	6	(4.5)
Parent/Carer	14	(6.9)	2	(2.9)	12	(9.1)
Driving purpose (*n*/%)						
Commuting to work	119	(58.9)	38	(54.3)	81	(61.4)
Leisure and errands *(includes childcare duties)*	74	(36.6)	26	(37.1)	48	(36.4)
Driving as part of job	8	(4.0)	5	(7.1)	3	(2.3)

3.7.2. Number of negative events reported

Two-hundred and two participants completed all three diaries, resulting in a grand total of 606 diaries. Table 3.4 shows means and standard deviations for the number of events reported in each diary, as well as for the entire diary-keeping period. The total number of events reported over the diary period ranged from 0-24 events with an average of 4.58 (*SD* = 3.91) events over one week of driving. Eight participants did not report any negative events during their diary keeping period. An independent samples *t*-test found no significant differences in the number of negative events reported by males compared to females.

The means and standard deviations displayed in Table 3.4 highlight that the number of participants reporting having not experienced a negative event increased with each consecutive diary. A one-way repeated measures analysis of variance revealed that these differences in the number of negative events reported were statistically significant F (1.87, 387.78) = 29.80, p<.001. Pairwise contrasts showed that there were significant differences between the number of negative events reported in Diary One and Diary Two (F (1, 207) = 26.27, p<.001) and between

Diary Two and the final diary (F (1, 207) = 6.92, p<.009). Possible reasons for these significant differences and the impact of them on the study will be addressed further in the discussion (section 3.12.3).

Table 3.4.Breakdown of number of events reported in driver diaries.

Diary Number	0 events	1+ events	*M*	*SD*
Diary One	50	152	2.03	1.96
Diary Two	53	149	1.41	1.57
Diary Three	78	124	1.11	1.39
Total	8	194	4.58	3.91

3.8. Executive summary of thematic analysis findings

The following sections will document the key findings that emerged from the thematic analysis. However, in order to provide a context for these key themes, a general overview of what the diaries reported will be provided, along with a succinct summary of the major themes.

Drivers in the current study described events that occurred on a variety of roads, ranging from suburban streets to arterial roads and major highways. Somewhat unexpectedly, a small but noticeable handful of drivers reported events that occurred while entering and leaving car parks. Additionally, drivers largely reported that the events they described occurred during a standard, routine commute (e.g., driving to and from work). Somewhat surprisingly, there was very little variation in the feelings drivers described prior to the event occurring: many reported being in a good mood and not experiencing any time pressures or unexpected traffic congestion. This highlights that negative events that may precipitate aggression appear to be part of the regular driving experiences of many motorists.

As demarcated in section 1.7, the current research focuses on understanding non-violent forms of driver aggression, as non-violent driver aggression appears to be more widespread and reflective of most drivers' experiences with aggression. Reflecting this, the types of negative events that drivers reported ranged in severity but, were not violent or extreme in nature. Similarly, drivers reporting aggressive retaliation described responses that ranged in severity but were mostly non-violent. While it must be acknowledge that this is likely to be due to instructions advising

participants to not report events of this nature, nevertheless, this finding does appear consistent with that of other research that the experiences of many regular, everyday motorists with driver aggression do not appear to involve violence (Australian Associated Motor Insurers, 2011; Galovski et al., 2006; Government Insurance Office, 2011). Furthermore, despite efforts in the instructions to encourage drivers to consider events that they may have either intentionally or unintentionally instigated, the diaries largely described events that they believed another driver instigated.

Finally, drivers described negative events that were either common, familiar experiences that they seemed to encounter regularly, or events that involved a specific group or class of drivers (e.g., drivers on a provisional licence). Many drivers appeared to regard the events they reported on as negative experiences, because they considered the behaviour to be discourteous or disrespectful, yet they also described retaliating with aggressive intentions to teach the other driver a lesson. Interestingly, a subgroup of drivers was identified that appeared to gain a sense of satisfaction by failing to respond aggressively, despite reporting that they experienced negative emotions in response to the event.

3.9. Content analysis results

3.9.1. Initial provocative events

The final coding frame for responses concerning the types of events drivers reported as provocations is detailed in Table 3.5, and consisted of four distinct types of events. These were identified as events involving being cut off by another motorist, abrupt lane changes or poor merging behaviour; events involving general erratic, or dangerous behaviour; instances of blocked or impeded progress; and experiencing rude or aggressive behaviour. It should be noted that the cutting off behaviours that comprise the first code appeared to be commonly reported by participants. However, there was debate between the researcher and the research assistant in the development of the coding frame about how these events should be conceptualised. Specifically, the deliberations surrounded whether these events should be included in the code representing erratic behaviour, or in the code representing rude behaviour. Cutting off behaviours are arguably dangerous, and many participants certainly described them as such. However, there were also many instances where participants described these same behaviours in terms of their rudeness, thus more consistent with a violation of etiquette. As it could not be

discerned whether they were primarily considered rude or dangerous, they could not be meaningfully placed in either category. However, as quite a large number of diaries reported events such as these as provocations, it was decided to code them as their own unique group. Finally, events that could not be described according the above were separated into their own group and assigned a unique code to indicate as such.

Each researcher used the coding frame to code each response, assigning every response a single code that best represented the event being described. Results of each researcher's initial coding were compared using Cohen's kappa (κ) to assess the level of agreement between the researchers. Cohen's kappa is a widely used statistic in psychology to assess inter-rater reliability on nominal data. It has been shown to be more robust measure than just the percentage of agreement as the statistic takes into consideration the agreement that may occur due to chance alone (Byrt, Bishop, & Carlin, 1993; Gwet, 2008). This analysis revealed moderate agreement $\kappa = .673$, $p<.001$ in the initial coding round. Instances where the researchers disagreed on the assigned code were identified and each instance was discussed, to clarify each individual interpretation and reach an agreement regarding the code assigned to it. Diary responses where there was not initial agreement between researchers were then independently recoded after these discussions and inter-rater reliability statistics revealed that Cohen's κ had increased to .957, $p<.001$, indicating a strong level of agreement. Instances where agreement could still not be reached following the second round of coding were coded as 'other'. The 'other' code represented approximately 6% of responses, meaning that 94% of responses were able to be assigned a discrete code.

Table 3.5. Coding frame for initial provocative events.

Code number and name	Description	Examples
1. Cutting off and changing lane related.	Refers to all instances where the participant reported a vehicle moving in front theirs. It included instances where a vehicle abruptly intruded on safe space with inadequate warning or space to do so; and instances where visible gaps were intruded on or closed by another driver when participant attempting to change lanes or merge themselves.	"*I was driving along Kelvin Grove Road coming to work and a P plate driver pulled in front of my car in the "safe space" I'd left between my car and the one in front*." "*I needed to change lanes so that I was in the right lane so that I could turn right at the next lights and another car would not let me in and instead sped up to make it harder for me to change lanes. I missed the turn*."
2. Erratic driving.	Refers to instances where the participants reported a dangerous or erratic manoeuvre that did not involve cutting off behaviours or behaviour that falls into other categories. Commonly reported behaviours include tailgating, speeding and weaving, risky overtaking, failure to give way.	"*Being tailgated by another vehicle City inbound*." "*Driving along Wynnum Road at a very sharp bend. I was in the inside lane, and there was a car on my outside. That car was slightly in front of me and cut the corner, forcing me to brake suddenly*."
3. Blocked Progress.	Includes instances where the participant reported that their journey or progress was somehow impeded. Included instances of a slow driver, as well as events where a driver had inappropriately used the space on the road (e.g., leaving a large gap between vehicles in a slip lane that prevents other vehicles from entering the slip lane), distracted drivers failing to recognise a light change, major traffic obstructions (e.g., roadworks, level crossings) and being unable to overtake a slow driver.	*"I was queuing in traffic, approaching a set of traffic lights on Boundary Rd at Camp Hill. It is single lane which becomes two lanes closer to the lights so some drivers can turn right. The car in front of me stayed centre of the road even when the additional lane became available, stopping me from being able to move up the queue to the right lane – so I missed the light*." "*Driving home on a fast stretch of the Gateway I got stuck behind a driver going 20km/hr slower than the speed limit and everyone else. Drivers behind me pulled out to overtake meaning I could not*."
4. Rude and Aggressive behaviour.	Includes instances where the participant reported perceiving an aggressive behaviour directed towards them and instances where the participant reported escalation.	"*Waiting for cars to pass before turning into Kingston road and then getting beeped on from behind*." "*I was travelling comfortably home from work Northbound on Beerburrum Road in Caboolture, in a busy line of traffic when a man in a black ute cut in front of my car, I had to jam the brakes on, so as to not hit him, I tooted the horn and so he stuck his middle finger up at me."*
5. Other.	Events that could not be coded according to the above or where the coders could not reach agreement.	*"Approaching a single lane bridge (for which I was required to give way) I didn't see the oncoming car soon enough and was unable to give way resulting in us both crossing the bridge at the same time."*

3.9.1.1. Frequency of different reported initial events

There were 208 completed responses in Diary One and of these responses, 50 indicated that they had not experienced any provocative events and were therefore not required to complete the remainder of the diary questions. Thus there were 158 diary entries where at least one provocative event was reported and drivers were required respond to the open-ended diary questions.

Frequency analyses were conducted on the coded responses. Results are shown in Table 3.6 and reveal that events coded as erratic driving were the most frequently reported type of response, representing 34.8% of responses. Events coded as blocked progress comprised 29.7% of responses and cutting off events comprised 22.7%. There were ten events coded as rude or aggressive, and ten instances where agreement could not be reached, representing 6% of responses each.

Table 3.6. Frequency of different types of initial events.

Type of event	Number of responses	% of responses
Cutting off and changing lane	36	22.7%
Erratic driving	55	34.8%
Blocked Progress	47	29.7%
Rude/Aggressive	10	6.3%
Other	10	6.3%

n = 158.

3.9.2. Perceptions and beliefs

The coding frame for responses to questions assessing drivers beliefs about why the event was regarded as a provocation are displayed in Table 3.7, and reveal four distinct different reasons provided: because it was rude or discourteous; because it was dangerous; because of the participant's own reaction to it; or because of external situational factors.

Although the diaries were piloted using a sample of colleagues, friends and family, it appears that some participants did not understand what was being sought in this question. Specifically, the question assessing these beliefs asks: "*of all the interactions you experienced, why do you regard this one as the most negative?*" However, there were many participants who only reported one event in the previous 48 hours and who responded to this question with 'only experienced one event', which did not provide information about their thinking processes. Responses worded in this way were assigned a separate unique code, rather than including them in the 'other' category.

Table 3.7. Coding frame for why the reported events were considered provocative

Code name and number	Description	Example
1. Rude/Discourteous.	Refers to all instances where the reason provided discussed the event as negative for reasons such as poor manners, inconsiderate behaviour, selfishness, and/or a failure to adhere to behaviours considered to be polite driving practices.	"*Because people are inconsiderate and do not think of the many others behind me that they are also holding up when it was quite safe to do road speed.*" "*The traffic is heavy and you are trying to maintain the flow and move onto the freeway when inconsiderate drivers do not make it a smooth merge.*" "*Because it was a rude & selfish act by the driver. They seemed to think that it was ok to push in front of everyone else in the right lane. They were using the merge lane as an overtaking lane.*"
2. Dangerous.	Refers to all instances where the reasons provided described the event as negative due to the potential for a collision, threatening one's safety, or the consequences that could have occurred as a result.	"*Because it could have potentially caused an accident.*" "*It endangered my safety. There was another truck behind the one with the high beam, we were negotiating a bend in the road and my vision was impaired for what was too long*". "*It would have had the most impact on me and my family physically. At that speed if we collided, I believe there would have been physical and emotional damage.*"
3. Self.	Refers to instances where the reasons provided described the event as negative due to internal factors. This included describing the event as a personal pet hate, or in terms of its familiarity. It also included descriptions where the response focused on the participant's reaction to the event.	"*Slow drivers make me extremely annoyed and impatient.*" "*It happens so frequently that it is an expected irritation.*" "*Because I actually had to react rather than just let it pass away.*"
4. External Situation.	Refers to instances where the event was described as negative because of external or situational factors such as time pressure or road conditions.	"*Because I was trying to get home to my children who were home on their own(teenagers)"* "*The overall road and weather conditions - lack of visibility.*"
5. Other.	Descriptions that could not be coded according to the above or where the coders could not reach agreement.	"*Because it lasted the longest.*"

Following the same processes as detailed in the above section, Cohen's κ following the initial coding of responses revealed moderate agreement between the researcher and research assistant, κ = .764, p<.001. After discussions regarding instances where the researchers disagreed and a subsequent re-code by both researchers, inter-rater reliability had increased to .965, p<.001, representing strong agreement. Instances where agreement could not be reached were coded as 'other' and instances where the question was misinterpreted, as outlined above, were coded to represent this.

3.9.2.1. Frequency of different reported negative perceptions

As Table 3.8 shows, frequency analysis of coded responses revealed that responses coded as describing rude or discourteous behaviour, and dangerous behaviour were the most frequent, comprising 22.1% and 21.5% of responses respectively. Just over 20% of responses were coded as describing the event as provocative because of their reaction to it, while 6.3% described external, situational factors. Only 5.5% of responses could not be coded; however, 22% of responses were coded as a misinterpretation of the question.

Table 3.8. Frequency of different types of driver perceptions regarding why the event was considered provocative

Perception	Number of responses	% of responses
Rude/Discourteous	35	22.1%
Dangerous	34	21.5%
Self	32	20.2%
External situational	10	6.3%
Other	9	5.5%
No response	36	22.2%

n = 158.

3.9.3. First Thoughts

The coding frame for responses concerning participants first, initial thoughts in response to the event are documented in Table 3.9. They consisted of five categories representing different types of thoughts reported in driver diaries. These were given code labels of: judgmental or derogatory comments about another driver's lack of skill; displays of poor etiquette; general exclamations, musings and expletives; compensatory thoughts about potential consequences of the event, and frustrations concerning the regularity of the event.

Inter-rater reliability following the preliminary code revealed moderate agreement between the researchers (κ = .696, p<.001) and increased to κ =.981, p <.001 after recoding following discussions where there was disagreement.

Table 3.9. Coding frame for responses concerning first thoughts in response to events

Code name and number	Description	Example
1. Judgmental derision of the other driver.	Refers to responses where the thoughts provided consider another driver as a bad driver. Includes instances where the participants mentally insulted or ridiculed another driver, questioned or corrected their behaviour in a derogatory manner.	"*Where did this knob learn to drive?*" "*Hurry up, for god's sake, read the give way sign.*" "*What is he doing, he nearly hit us, what a prat.*"
2. Rude /discourteous.	Refers to responses where the first thoughts provided focus on the perceived rude or discourteous behaviour displayed by another driver.	"*Dammit, some people just don't think of anyone else but themselves on the road.*" "*Is this guy for real, he's going to hold up the whole road just so he can turn?*"
3. General thoughts& other.	Includes all responses where the thought provided reflects a general observation of the event or an obscenity, but not directed towards another driver. Also includes instances where coders could not reach agreement.	"*What is that stupid bus stopped there for*?" "*I hate driving.*"
4. Compensatory or related to potential consequences.	Refers to instances where the first thoughts are about consequences or about taking appropriate action to remain safe.	"*I need to keep a larger distance in front of myself to compensate for this driver*." "*Slow down and brake, take evasive action.* *I have to be really safe as I have my 2 kids with me on the back of the car*."
5. Frustrated thoughts about frequency of event.	Refers to thoughts that suggest that the event is a familiar, frequent event, encountered regularly.	"*Not again!!!!! Stupid driver!!!"* "*You are kidding me, not again*!" "*Here we go again....*"

3.9.3.1. Frequency of different reported first thoughts in response to events

As Table 3.10 shows, more than half of the reported first thoughts (51.8%) were coded as judgemental, mocking comments about the other driver's poor driving skills (see Table 3.9). Thoughts coded as considering another driver as rude comprised 17.7% of responses, comments about compensating for the reported event

or the potential consequences of it comprised 10.1% and thoughts about the event being familiar comprised 6.9%. Following the recode, there were only two instances where the research and research assistant did not agree. Rather than keep these two responses separate and giving them their own code, for this analysis, they were included in the general thoughts category.

Table 3.10. Frequency of the reported first thoughts in response to reported events.

First thought	Number of responses	% of responses
Judgemental derision	81	51.8
Rude/discourteous	28	17.7
General	21	13.3
Consequence related	16	10.1
Familiar	11	6.9

n = 158.

3.9.4. Attributions of cause

The coding frame developed from responses to diary questions assessing attributions is displayed in Table 3.11. Four discrete attributions were identified: stable-internal attributions where the event was considered to be a reflection of negative underlying dispositional characteristics of the offending driver; unstable-internal attributions to a driver that lacked skill; attributions focusing on situational factors or used alternative explanations for the event; and those that focused on their own role in the event.

Initial inter-rater reliability following the preliminary coding round revealed fair to moderate agreement between the researchers ($\kappa = .499$, $p<.001$). After discussion and recoding, reliability increased to $\kappa = .961$, $p<.001$.

Table 3.11. Coding frame for different responses concerning attributions for the event.

Code name and number	Description	Example
1. Internal-stable (personality).	Refers to all instances where the response provided attributes the cause of the event to internal, personality characteristics of the offending driver.	"*Nothing more than a driver who does this frequently and believes that he/she has the right to do so.*" "*The other driver being inconsiderate of other road users and not caring that others may want to travel at the legal speed.*" "*Certain people are bold enough to do this to save themselves a tiny bit of time etc. I think they don't care what others think or don't care that they are being pushy and impolite.*"
2. Internal-Unstable (skill).	Refers to all instances where the response attributes the event to a deficit in the other driver's skill or an error that another driver has made. The responses refer more to the driver's behaviour rather than personality attributes.	"*The young driver was not looking in rear vision mirrors.*" "*The other driver was texting on the phone and not paying any attention to her driving.*" "*Some people have a poor understanding of the road rules.*"
3. Situational factors.	Refers to attributions where external, situational factors were emphasised or the participant appear to consider alternative explanations for the event rather than blaming another driver.	"*The traffic was banking up and the driver probably didn't leave enough time for their journey and felt pressure to get there.*" "*The time of the day, and just a generally confusing stretch of bitumen.*" "*The person in front not knowing where they needed to go, so was going slow to look at landmarks.*"
4. Self.	Refers to attributions where the participant's own role in causing the event were emphasised.	"*I might have been slow at reacting to an opening within the passing cars to move into the lane.*" "*I was impatient and didn't want to sit behind all the cars in the left hand lane.*"
5. Other.	Events that could not be coded according to the above or where the coders could not reach agreement.	"*The other driver.*"

3.9.4.1. Frequency of different types of attributions for reported events

Inspection of frequency analysis revealed that over half (53.1%) of responses were coded as attributing the event to stable dispositional characteristics of the other

driver. Only 17.7% of responses were coded as attributing the event to deficits in the other's driving skills and 16.4% to the situation. Finally, attributions that focused on the participant's own role in the event comprised 7.5%. Five percent of responses could not be coded. These are depicted in Table 3.12 below.

Table 3.12. Frequency of codes for attributions about the event.

Attribution type	Number of responses	% of responses
Internal Stable (personality)	84	53.1
Internal unstable (skill)	28	17.7
Situation	26	16.4
Self	12	7.5
Other	8	5.0

n = 158.

3.9.5. Behavioural Response

The coding frame developed to reflect participant's described behavioural responses to the event reported is outlined in Table 3.13 and consists of three distinct behavioural responses: aggressive behaviour that appeared to be intended to have a negative impact on the target; venting behaviours; and compensatory behaviours or evasive action.

Following the process described above, the coding frame for the behavioural responses was developed in conjunction with the second researcher; however, given the high level of consensus in the development of the coding frame, and the high level of consistency in coding the previous questions, the thesis author carried out the coding of responses alone.

Table 3.13. Coding frame for behavioural responses to event.

Code name and number	Description	Example
1. Aggressive behaviour.	Behavioural responses where drivers describe the purpose of their behavioural response in ways that suggested they intended it to physically or psychologically harm the road user it was directed towards. Often included overt behaviours such as horn-honking or tailgating, but also included antagonistic behaviours such as deliberately causing a delay.	*"I got out of the car and shouted at the other driver and asked him what he was doing."* *"I waved my hand at the gentleman using only my index finger in the air."*
2. Vent.	Behavioural responses that involved behaviours such as loud sighs, rolling eye, head shaking, and yelling, but within the confines of vehicle and not directed to offending driver.	*"Swore under my breath. I was feeling irritated and it seemed the only thing I could do to ease the irritation and gain back some level of control."* *"Swore under my breath, took a deep breath."*
3. Compensatory behaviours and evasive action.	Behavioural responses where the participant described behaviours aimed at avoiding a collision and/or remaining safe.	*"Slowed down. So as not to cause an accident."* *"Slowed down slightly as I was concerned that they may cause and accident any minute and I wanted to be as far away from them as possible."*
4. None.	Refers to responses where the participant did not engage in any behavioural response.	*"Just carried on."* *"Kept driving as normal."*
5. Other.	Responses that could not be coded according to the above.	*(in response being stuck at numerous lights) "Got cranky at the price of petrol, that this was costing me $$."*

3.9.5.1. Frequency of reported behavioural responses

As Table 3.14 shows, the most common type of reported behavioural response discerned from diary entries was venting behaviours, which represented 37.3% of the total responses. Adopting a compensatory behaviour or taking evasive action was the next most common behavioural response (26.5%), followed by an aggressive response, which accounted for 23.4% of the coded responses. Only 12.6% of responses were coded as not engaging in any behavioural response.

Table 3.14. Frequency of codes for behavioural response to the event.

Behavioural response	Number of responses	% of responses
Aggressive	37	23.4
Vent	59	37.3
Evasive action	42	26.5
None	20	12.6

n = 158.

3.10. Interim Summary

The above sections document the findings of a series of content analyses conducted on diary responses to questions pertaining to the five key constructs of the model under investigation. These analyses were able to highlight common thoughts from drivers regarding each of these key constructs. However, as described, to supplement the information contained in these analyses, a thematic analysis was conducted to identify general themes that emerged throughout the diaries. The results of this analysis will now be described.

3.11. Themes identified in thematic analysis

3.11.1. Theme One: Violating 'Driving Etiquette'

The first theme was drawn from comments provided in the diaries where drivers appeared to refer to their expectations that motorists should be respectful, considerate, and polite in their interactions with other drivers, as illustrated by the following diary comment:

> *"Drivers should respect each other on the road. If you, as a driver, see another driver indicating to make a turn, you should respect that driver enough to try to move forward or slow down for him/her to pass" (Female, 28).*

This comment conveys an expectation of how drivers should behave: with respect and consideration for other motorists. Thus the term "driving etiquette" was used to describe this pattern of expecting polite and courteous driving behaviour. A precise definition of what constitutes proper driving etiquette was difficult to discern in the diary responses, given that due to the nature of the study, drivers reported events and behaviours that would more closely align with poor driving etiquette. Based on diary responses, however, poor driving etiquette appeared to be discussed as inconsiderate behaviour: behaviour that the motorist perceived was motivated by

selfish intentions, behaviour that did not consider other motorists' needs, or behaviour that ostensibly, lacked consideration of how it may impact other motorists. By extension then, it can be suggested that good driving etiquette is polite behaviour that demonstrates an awareness of, and consideration towards other motorists' needs, as seems evident in these two diary entries:

> *"Not only was it dangerous, it was the fact they didn't think what they had done was wrong. If they had cut me off and not realised it, as I have before, a simple wave to admit that they were wrong and/or sorry would suffice" (Male, 31).*

> *"The other driver's inconsiderate actions... If there is heavy traffic and it is not easy to move lanes, you should not be occupying the fastest lane if you are driving below speed limit." (Female, 31).*

Both of these quotations appear to convey what these drivers consider to be appropriate driving behaviour: apologising for mistakes and not delaying others. What is interesting to note about the first quotation (Male, 31) is that he mentions that the event was dangerous. Nevertheless, his remark appears to focus on the fact that the offending driver did not acknowledge the dangerous situation, and the negativity surrounding the situation seems to stem from the apparent violation of his expectation that drivers should apologise for their poor behaviour. That is, the ostensible etiquette violation seems to be the negative aspect for this driver, rather than the danger.

Germane to the current research, not only did diary responses indicate that drivers appear to believe that motorists should display good etiquette, comments also indicated that the negative emotions that can subsequently result in aggression (e.g., anger, frustration) appeared to be triggered when a motorist reported perceiving that another driver had violated etiquette. To illustrate, consider the following comments that were provided by participants to describe why the reported event was something they considered to be a negative experience:

> *"It shows that drivers aren't thinking about other drivers" (Female, 35).*

> *"I felt really angry that someone would be so rude" (Female, 29).*

"There were two negative influences. The slow driver, and the people behind me who would not wait their turn to overtake the slow Ute" (Male, 44).

"Because it was a rude & selfish act by the driver. They seemed to think that it was ok to push in front of everyone else in the right lane"(Female, 45).

Overall, what the six quotations presented above appear to have in common is that they implicitly refer to an expectation; a belief about how drivers should behave, and what is regarded as appropriate driving behaviour: drivers should think about other motorists, wait their turn and not "push in" in traffic, and apologise for mistakes. These quotations also suggest that when this expectation for considerate, orderly, polite behaviour is not met, negative emotion results, as evidenced by the quotation from the driver who directly stated that she felt angry following the rude behaviour. Accordingly, this theme was labelled "violating driver etiquette" to reflect the negative emotions that appeared to result when drivers perceived another motorist was discourteous.

Furthermore, not only did perceiving that another driver had violated expectations for appropriate etiquette appear to generate negative emotions, it also appeared to precede an aggressive response directed towards the offending driver. To illustrate, the following example is offered from a female participant who was delayed by a driver who had stopped at a green light in a lane designated for drivers turning left, while the lane next to it for traffic proceeding straight ahead had a red light. She reported lightly tapping the horn with the intention of alerting the stopped driver that the light was green, believing that he simply had not noticed the light change. The driver was reported to have responded by giving a wave out the window that the participant described as dismissive, and remained stationary at the green light, accelerating abruptly when the light for the lane travelling straight ahead turned green and pulling in front of drivers travelling in that lane. The participant described the reason why she considered this event to be provocative as:

"It came across as more of an "I don't care about anyone else" show from the driver. By being in the wrong lane on purpose, he was holding up many other people just so he could get one car ahead of where he would have been. I found this to be the height of inconsideration. Other people were/are in a hurry too!" (Female, 18).

Two important and related inferences are drawn from this comment. Firstly, although it possible that the offending driver may have been in the wrong lane unintentionally, but unable to rectify the situation while stopped at lights, the participant's comment describes him as being in the wrong lane on purpose, ostensibly to get ahead of drivers travelling straight. Thus these remarks would indicate that she perceived the behaviour as deliberate, motivated by selfish intentions at the expense of the drivers who were held up in the turning lane. Secondly, it appears that based on her perception that her journey had been intentionally delayed by what she believed to be the selfish actions of the driver, she labelled the event inconsiderate. Her diary goes on to describe her behavioural response as waiting for the driver to look in the rear view mirror at her and then doing the following:

> *"I just shook my head. I made a point of showing that I wasn't impressed as I could see he was still looking in the rear view mirror. So while I still felt irritated I felt like I had somehow gotten a little bit of my own back".*

While this response is certainly mild, it still meets the definition of aggressive driving adopted in the research: she describes the purpose of it as expressing her condemnation of his behaviour, which appears to be motivated by her apparent interpretation of his behaviour as deliberate and selfish. Another example of an aggressive response to behaviour that appeared to be perceived as poor driver etiquette comes from the following participant, who reported honking the horn at a driver who drove up the shoulder of the road in heavy congestion following a traffic collision, ostensibly to progress his own journey. She further reported that the message she was trying to convey with the honk as:

> *"You're a cheater! We saw you pushing in! We've been here for ages! Wait your flaming turn!" (Female, 34).*

Two similarities between this behavioural response and the one described earlier are apparent. Firstly, their motivations appear to be to communicate disapproval, and to shame or criticise the offending driver (a topic that will be discussed further in connection with the next theme (see section 3.9.2) Secondly, they express their disapproval of drivers engaging in what they considered to be

unfair, selfish behaviours that put their own needs above others. This was also apparent in many other comments made in diaries, as evidenced by the following:

> *"They made a whole lane of traffic (which would have continued flowing) wait because these drivers couldn't wait for the bus to drop off and pick up passengers, which doesn't take very long" (Female, 29).*

The examples provided so far to illustrate this theme describe perceptions of cutting-off behaviours as consistent with the idea of poor driving etiquette. However, similar sentiments and terminology were observed in diary entries discussing behaviours such as slow driving, with slow driving often described as inconsiderate or thoughtless, as shown by the following:

> *"I felt annoyed they were so thoughtless and couldn't just follow the speed limit and keep traffic flowing"(Male, 27).*

> *"People are inconsiderate and do not think of the many others behind me that they are also holding up when it was quite safe to do road speed" (Female, 50).*

What is interesting about these comments is that rather focusing on the delay caused by the slow driver, the behaviour appears to be regarded as negative because the slow driver, ostensibly, did not consider how their slow driving may affect other motorists travelling behind them. Therefore, it appeared that slow driving could also be considered consistent with the notion of violating driving etiquette, because it seemed to be perceived as a lack awareness and consideration towards other drivers:

> *"Driver in front was not paying attention to what was around them. I find the behaviour careless and inconsiderate" (Male, 51).*

> *"The driver was totally ignorant of what was going on around him and what he was doing to the rest of us" (Female, 44).*

As can be seen, there are many instances and examples of what constitutes poor driver etiquette and its potential connection with driver aggression encapsulated in this theme. However, the notion of what comprises good driver etiquette will be explored further in follow up interviews detailed in Chapter 4.

3.11.2 Theme Two: "Teaching them a lesson": Justified retaliation

Mirroring recent findings from Lennon and colleagues (2011; 2011), comments provided in diary entries suggested that for some drivers, the purpose of their response to provocations was to deliver negative feedback by shaming, criticising, and communicating disapproval of the target driver's behaviour, with a view to prompting recipients to amend their driving. To illustrate, many drivers who described honking their horn also included references to their intentions to convey their condemnation of the target driver's poor driving behaviour, for instance,

> *(In response to being undertaken) "I beeped my horn at him, took a deep breath and then continued driving. I have to let the other person know of his despicable driving behaviour" (Female, 36).*

> *(In response to being cut off) "I honked my horn until I got the young male driver's attention, and then I pointed to my eyes to indicate he should look where he's driving" (Female, 62).*

These responses appear to suggest that the drivers intended to convey having taken umbrage at the target motorist's behaviour and believed that they should express their criticisms to that driver. Interestingly, the first response (Female, 36) is expressed as though her aggressive behaviour in retaliation to the poor driver is almost an obligation or a duty: she has to let people know of their apparent despicable behaviour. An inference that can be drawn from her comment is that she may feel she has to let them know their behaviour is poor, so that they can amend it. That is, the desire to teach them a lesson is apparent, because presumably, by alerting the driver to the apparent despicable behaviour, she may anticipate that they could learn to behave better. The apparent desire to teach drivers a lesson is more directly evident in the second quotation (Female, 62): she wanted to teach him that he should look where he was driving.

Further evidence for this theme could also be discerned in diaries where participants reported tailgating. Tailgating behaviours were reported quite frequently in diary entries that described events where the participant considered their progress had been blocked or impeded by another driver. These drivers described their tailgating behaviour as intended it to signal to the other driver that they were causing an obstruction and should get out of the way:

"Moved my car closer to him, so that maybe he would notice I'm trying to go past" (Female, 30).

"I drove close and flashed my lights in order to show I wanted to get past too" (Male, 52).

Interestingly, drivers who described being the recipient of tailgating in their diaries appeared to interpret the instigators' motives in a similar way: recipients described believing that the tailgater had taken offence to their driving, particularly the speed with which they were travelling. However, these drivers did not appear to perceive the tailgating as a signal to remove the impediment they are perceived to be creating. Rather, comments provided by tailgated drivers often described the tailgater's behaviour as intimidation and bullying, and appeared to regard it as an attempt to coerce them into breaking the rules (e.g., by speeding). In response, most of these drivers described adopting behaviours that appeared to be motivated by defiance, to send a message to the tailgater that they cannot be pressured. The most typical of behaviours was deliberately driving more slowly, which is evident in the following extract:

"I always slow down when someone sits on my tail. Never to a ridiculously slow speed but I always feel I have to let them know I'm not going to be bullied into speeding" (Female, 61).

When statements such as these are considered alongside statements from participants who reported that they instigated tailgating, several points to reflect on are apparent. First, it suggests that there may be a shared assumption regarding the purpose of tailgating: drivers understand tailgating as a signal used to communicate to drivers that they are driving too slowly, and should speed up or move out of the way. This intention is certainly apparent in diaries of participants who described instigating the behaviour; however, in the case of participants reporting being tailgated where the actual intentions of the tailgater are unknown, it is just that: an assumption that the tailgater is asserting their desire to travel faster. Nevertheless, what was apparent from the diary responses of tailgated drivers is that this assumption was often met with defiance, and appeared to motivate a subsequent aggressive response. To that end, this collection of responses highlights the potential for escalation in driver aggression: both the tailgater and the target driver seem to

consider themselves the victim in the incident, and both may respond with aggression using behaviours that can be considered risky and can increase crash risk.

Behaviours that were categorised in this theme that also described the purpose of their response as a way of teaching the target driver a lesson were not limited to overt behaviours such as the ones discussed above. In particular, two subtle types of behavioural responses with similar motives were also evident: antagonistically creating a nuisance for the offending motorists and attempting to scare them. To elucidate, some participants described the intentions of their reported behavioural responses as intending to annoy or frustrate the recipient driver. To illustrate, a female participant reported that a motorist gesticulated towards her when she was slow moving from a green light. She described responding to the gesticulating driver in the following way:

> *"I made sure that I slowed down so the driver was further inconvenienced" (Female, 26).*

An interpretation drawn from this comment is that she was seeking to convey having taken umbrage at the gesticulating driver, having felt unnecessarily criticised by their gesture. However, unlike the responses of participants who reported being tailgated, where the response appears to be motivated by defiance, the behaviour here appears to have more hostile intentions: she appears to describe the purpose of her response as primarily to irritate, annoy, and inconvenience the target driver further, presumably so that their actions (i.e., the gesticulating) will have a negative consequence. In this sense, her behaviour is consistent with the definition of aggression adopted in the current research, as it appears to be intended to cause psychological harm in the form of frustration.

Other diary entries described the purpose of their responses as attempts to frighten another motorist by engaging in a behaviour that would presumably lead the target driver to believe they almost caused a collision:

> *"Allowed my car to finish stopping very close behind theirs. This, in the hope that they realised how close they came to having an accident, and they should have checked for traffic, before joining the car park main thoroughfare" (Female, 50).*

"I braked harder than normal and tried to scare him a bit, but I didn't want to cause an accident. I did this because I didn't want him near me" (Male, 18).

The interpretation drawn here is that the described responses are intended to teach the target driver a lesson by leading them to believe they almost caused a crash, thus presumably making the target driver reluctant to repeat the same behaviour in future. These comments again call attention to the issue of escalation, and highlight the potential danger drivers may be willing to engage in when faced with behaviour they disapprove of: both of the behaviours described in the responses above had the potential to result in a crash.

Further evidence of antagonistic and potentially dangerous responses was found in diaries where drivers reported their perceptions that another motorist had intentionally prevented them from merging, or deliberately positioned themselves in the wrong, faster moving lane of traffic in order to "push in" up ahead:

(In response to a motorist who moved to the fastest moving lane of traffic in heavy congestion before attempting to move back into their original lane further ahead) "Sped up so they couldn't get in front of me" (Female, 24).

(In response to a driver closing the gap when attempting to merge) "I continued to move …the other driver ended up driving on the lane for oncoming traffic" (Male, 52).

Both of the responses described above are dangerous and could have resulted in a collision. Nevertheless, both of these comments and the ones provided earlier suggest that the drivers appear to be committed to expressing their disapproval, perhaps even at the expense of their own and the target driver's safety.

The apparent commitment to conveying disapproval and communicating that another driver's behaviour was wrong is also evident where the descriptions provided in diaries appear to document an event that escalated. To illustrate this, comments offered by a female participant who reported that she almost collided with a bus will be provided as an example. This participant reported that she believed the bus driver to be at fault for the near collision, and gesticulating and yelling obscenities at him in

response. She also reported that the bus driver responded to her by honking the horn. She recalled feeling angry at his horn-honking, as shown by the following comment:

> *(I felt) "Angry because the guy made me feel like I had done something wrong" (Female, 30).*

This comment clearly states that she was made to feel as though she had done something wrong, which by extension, implies she believes she did not, and moreover, that the bus driver had done something wrong. The evidence of escalation was apparent when she then reported honking the horn in return, to then be subsequently yelled at by the bus driver. She described the purpose of her counter-responses as follow:

> *"I just wanted to show the driver how it was from my view ... that he clearly wasn't checking his mirrors".*

Taken together, her comments are interpreted as follows: she believes the bus driver to be responsible for causing the near collision, thus she perceives his responses (horn-honking, yelling) to be undeserved criticisms directed towards her, to which she reacted aggressively, to convey her offence at the perceived unjust criticism. Interestingly, the last remark where she describes wanting to show him that he was wrong in ostensibly failing to check his mirrors was the very final comment she provided in her diary. Thus after recalling avoiding a collision and receiving a horn honk and verbal abuse from the bus driver, when she reflected on the incident, she appeared to still believe that the bus driver was in the wrong, because he did not check his mirrors.

Her responses also suggest that, even upon reflection of the event in the diary, she did not consider alternative explanations for the event, or consider her own role in the event. While it is acknowledged that this could be a consequence of self-presentational bias caused by not wanting to admit she had done something wrong in the diary, based on her description of the bus driver's counter-retaliation, it is possible that he may have believed that she was at fault. As such, escalation could be conceptualised as a stalemate between two drivers, who both perceive the other as wrong, who both believe that they have been unjustly criticised, and who both respond with what they perceive as justified aggression.

Finally, additional comments that comprised this theme suggest that aggressive behaviour designed to criticise the target driver are typical responses of many drivers, as illustrated by the following responses:

> *(When asked if the behavioural response – speeding up to prevent a driver merging; is similar to his responses in similar situations) "I will always react the same way when I come across idiotic and/or incompetent drivers" (Male, 52).*

> *"Yes [I] usually beep the horn if some idiot does something stupid on the roads" (Female, 25).*

> *"I tend to always react this way - speeding up and tailgating to make it clear I was cut off and not happy about it" (Male, 27).*

Comments such as these suggest two things: first, that aggressive behaviour may be habitual for many, and secondly, that it may reflect their beliefs about other drivers. Two of the quotations use derogatory words such as "stupid" and "idiots" to refer to other drivers; therefore, it is plausible that these drivers may believe that there are many motorists on the road who need to be made aware of their poor skills, by experiencing negative consequences as a result of them. Moreover, such comments also suggested that some drivers derive satisfaction from criticising another motorist's driving, as succinctly captured in the following quotation:

> *"(I felt) Vindicated at pointing out to the other driver that they had done the wrong thing" (Female, 53).*

For other participants, a sense of satisfaction was evident in responses that indicated that they appear to believe that the lesson attached to their aggressive response will be effective in modifying the target driver's behaviour, as shown by the following quotation:

> *(In response to witnessing a driver using a mobile phone) "Beeped at her, got her attention and shook my head - she understood what I meant…it'll save her life or some other innocent victim's life" (Male, 61).*

It is possible that the feeling of satisfaction derived from one's own aggressive behaviour, coupled with the belief that it is justified because the target driver did something wrong might reinforce similar responses in future.

3.11.3. Theme Three: Satisfaction and superiority

An interesting pattern of expression was evident in the diary entries of some participants who reported that they did not retaliate to others' behaviour, despite recalling feeling angered or frustrated by it in their diaries. As can be seen in the response provided below, comments made in diary entries comprising this theme were nuanced with an overtone of satisfaction or superiority that appeared to stem from drivers feeling pleased by their own restraint. Thus this third theme was labelled "satisfaction and superiority", and is reflected in the following response:

> *"I can't change other people's idiot behaviour. I just accept that lots of other people have not been as fortunate as I have been to have a good upbringing, which includes being aware of ethics, consideration of other people, etc., and I had the sense to gain an education when I was younger by studying part-time while working full-time, and I have used my knowledge of ethics and education to my advantage" (Female, 69).*

Several elements of this quotation are important to this theme. Firstly, the use of a derogatory and judgemental word such as "idiot" to describe the behaviour of other drivers suggests a level of derision towards them. Furthermore, the participant describes a range of desirable characteristics that she sees in herself: she appears to consider herself as a moral, thoughtful and well-educated person. Thus by highlighting desirable characteristics she sees in herself while simultaneously using a disparaging term to describe the offending driver, an implication that can be drawn from her comment is that she sees herself as superior to the driver in question, whom she describes as an idiot. Moreover, another comment provided by this same participant that succinctly encapsulates the essence of this theme suggested that this feeling of superiority was reflected in her driving behaviour and was evoked by not retaliating with anger or frustration to their triggering behaviour:

> *"I don't reduce myself to mediocrity by responding angrily to other people" (Female, 69).*

Thus the interpretation draw from these comments is that she perceives herself as superior to the offending driver, and if she were to respond angrily, she would perhaps lower her standards; hence, it appears that she took the moral highground.

Other entries classified under this theme were instances where participants similarly mocked, disparaged, and ridiculed another driver's behaviour while noting their own good behaviour. These comments had overtones that implied the drivers experienced a sense of satisfaction or superiority over the other driver, for example:

> *"I took a deep breath, ridiculed their ignoring of the speed limit and continued driving as I had been (that is, following the speed limit). (I felt) Self-righteous" (Female, 18).*

> *(On why she didn't respond) "I drive safely, cautiously, slowly, because I have kids in the car, and I actually care about the safety and welfare of fellow road users" (Female, 34).*

> *"Ignored the person and kept driving. (It would have been a) total waste of my time and effort to put my arm out of the window and wave to him in this manner, as he will only continue doing what he is doing until he kills himself" (Male, 51).*

A similarity among these comments is that they appear to disparage the offending driver's behaviour by comparing it their own; that is, they appear to regard their own behaviour, particularly their non-aggression, as superior. This is directly evident in the first quotation (Female, 18), where the driver explicitly states that she experienced a sense of self-righteousness by following the speed limit when she encountered a speeding motorist. However, it is more subtle and indirect in the other quotations. The second driver's use of the word "actually" to indicate that she cares about road users emphasises that she does consider how her behaviour may affect other motorists, and thus by extension, suggests that she believes others do not. Consequently, she may experience a sense of superiority, because her safe driving shows consideration to other motorists. In the final quotation (Male, 51), the derision towards the offending driver can be sensed in his reference to the fact that he failed

to respond, because he expects that the driver will lose their life in a fatal collision and a response would be futile.

Other material classified under this theme came from responses to the diary question asking participants to describe any responses they had considered engaging in, but had refrained. These comments highlighted that although many participants did actually think about, or consider an aggressive response, the reasons they gave for not carrying it out suggested that it was in order to avoid demeaning themselves, as illustrated by these two examples:

> *(On why she did not honk the horn) "...that would have been just as rude as what they had done so I refrained" (Female, 20).*

> *"None. Any other response or further action is dangerous and pointless and would make me on the same ignorant level" (Male, 61).*

What these remarks have in common is that they use derogatory words such as "rude" and "ignorant" to describe the other driver's behaviour, and describe their reasons for refraining from an aggressive response as avoiding engagement in what they appear to consider as rude or ignorant behaviour.

Taken collectively, these examples suggest that the decision whether to respond to an on-road trigger or not, and in what way, could be driven in part by perceptions of self; in particular, the moral self (Aquino & Reed II, 2002b; Monin & Jordan, 2009). This will be discussed further in section 3.12.1.2.

3.11.4. Theme Four: Vehicle and Driver Stereotypes

Consistent with suggestions by Dukes et al. (2001) and James (2000), evidence of stereotypes concerning particular types of vehicles and groups of drivers were evident in remarks provided in diary responses. More importantly, these comments suggested that the information contained in these stereotypes influenced participants' perceptions of the events they reported. The most prominent of the stereotypes that emerged will now be described.

P-Platers. Under Queensland law, provisionally licensed drivers are required to display a sign with a 'P' on their vehicle, thus provisional license holders are often colloquially referred to as *p-platers*. Further, it is common for many p-platers to obtain their provisional license at the age of 17 or 18, meaning that most p-platers are teenage drivers. Comments made in diary entries suggested that the drivers in this

sample regarded p-platers as rude drivers with little regard for other motorists and who drive as though they are infallible, despite their relative inexperience. This is evidenced by the following entries:

> *"Typical teenage behaviour, they seem to think they have the right of way and they are invincible" (Female, 38).*

> *"What a stupid typical p plater" (Male, 45).*

Both of these remarks use the word "typical" to describe the p-platers' behaviour, which implies that they consider the behaviour of the p-plater they observed to be common and representative of p-platers as a collective group. Moreover, the first quotation (Female, 38) offers an example of a type of behaviour the participant regards as characteristic of p-platers: putting their own needs first and driving without caution.

There is certainly scientific evidence to indicate that younger drivers are an at-risk crash group, and the over-representation of younger drivers in crashes is often reported in mainstream media (Doherty, Andrey, & MacGregor, 1998; Scott-Parker, Watson, King, & Hyde, 2014). As such, the well-documented crash risk of younger drivers may inform drivers' perceptions of p-platers as dangerous, reckless drivers. However, considered in the context of the current research, it is possible that based on the remarks observed in the diaries describing p-platers as thoughtless, dangerous drivers, that motorists holding these beliefs may be apt to interpret potentially innocent behaviour as deliberate and irresponsible when it involves a p-plater, which could result in aggression. To elucidate, consider the following account from a participant who recalled honking the horn several times at a p-plater she believed almost caused a collision by intentionally cutting her off. However, she states that the cutting off occurred at a highway on-ramp, where she was required to give way to heavy merging traffic, as shown by the following:

> *"[I]remember seeing quite a few cars who had to merge … it got me quite mad that I almost would have smashed the back of the car as he merged in front of me"(Female, 25).*

Merging onto a highway, particularly during busy times, often requires quick and decisive action by the merging driver, which may sometimes be misconstrued as

cutting off. This may have happened in the current example. The quotation above implies that although the participant was aware of the upcoming merge and reported that it was busy with many vehicles needing to merge, she interpreted the p-plater's merging as deliberate aggression, and a deliberate attempt to abruptly cut her off. Further comments provided by this same participant indicate that she made a stable-internal attribution regarding the intentions of the merging behaviour, presumably based on his status as a p-plater:

> *"A typical p plater driving like they own the roads."*

Similar to the quotation provided earlier, the use of the word typical indicates that she believes this behaviour to be characteristic of p-platers, and her description of the behaviour as "driving like they own the roads" suggests she considers p-platers as selfish or careless. Thus when considering her comments as a whole, alongside the context she provided for the event, it is possible that her interpretation and behaviour stems from an unforgiving attitude towards p-platers.

The suggestion that p-platers may be at greater risk of experiencing aggression directed towards them as a result of negative views held by other drivers about them was also evident when considering comments provided by drivers who were p-platers. These comments indicated that p-platers are aware of the negative views motorists hold towards them. To illustrate, a young female driver on a provisional licence provided the following attribution for a driver who she believed deliberately did not let her merge:

> *"He saw that I was a P plater and has had bad experiences with them in the past" (Female, 19).*

Furthermore, other participants who were p-platers reported experiencing aggression in their short driving histories, for example,

> *"I have had so much conflict on the roads and I've only just got my P's. If people aren't going to change the way they beep at me or yell out at my vehicle after being held up for 11 seconds behind a bus, then so be it" (Male, 21).*

Two inferences are drawn from these quotations: firstly, p-platers are aware that other p-platers may behave poorly, and secondly, they are aware that it may influence how other drivers treat them. These comments also mirror survey results

from AAMI (2012), described in section 2.8.1.2, that young drivers perceive being the victim of driver aggression at a higher rate than the general population. Of particular interest to the current study were a handful of comments that implied that perhaps the reason that drivers may believe that p-platers are poor drivers is that p-platers have not been taught to show courtesy to fellow motorists. Such comments are exemplified by the following quotation:

> *"The driver was displaying red P plates. Maybe they just weren't taught enough manners?" (Male, 43).*

When comments such as this are considered alongside the driving etiquette theme described earlier, a possible explanation for the apparent negative view of p-platers and aggression towards them is evident: perhaps it is possible that more experienced drivers believe that p-platers lack adequate driving etiquette, which possibly makes the behaviour of p-platers more likely to be perceived as provocative by other drivers.

Older Drivers. Expressions used in diary entries often reported the behaviour of older drivers as frustrating and annoying with some participants descriptions indicating that they believed that older drivers lacked the appropriate skills or confidence required to drive to the standards of other motorists, as illustrated by these two examples:

> *(Describing their first thoughts upon encountering a slow driver) "Another older driver who is not confident on the road" (Female, 38).*

> *(Attribution for a driver failing to merge) "Older driver lacking confidence to merge into a huge gap" (Female, 27).*

Notably, the first quotation (Female, 38) describes slow driving as an indication of the elderly driver lacking the confidence to adhere to the speed limit. Perhaps reflecting this assumption, other drivers in the sample also appeared to assume that slow driving behaviours were instigated by elderly drivers, even in the absence of physical evidence to support the assumption, as shown in the following examples:

> *"An old couple driving at 40kmhr on Stafford Road, 60kmhr zone" (Female, 44).*

"The person driving was an older person" (Female, 33).

(Referring to being stuck behind a slow driver) "Told them to hurry up (not that they could hear me in my car) and my partner and I discussed what characteristics we thought the driver would have, e.g. older" (Female, 24).

Furthermore, some diary responses also described older drivers' behaviour as dangerous or risky. Interestingly, the descriptions provided in diaries where the participant driver was recounting an event involving an elderly driver also suggested that they attributed their behaviour to a deficit in their driving skills stemming from age-related decline, as evidenced by the following:

"The driver of the first car was old, white-haired, and short with a very restricted view of the road over the dashboard. His reaction time and driving skills were obviously not good enough for highway driving" (Male, 61).

"The lady was old. She didn't have the capacity to realise the danger she was in by not checking the road first" (Female, 42).

While both of these quotations make reference to dangerous driving and substandard skills, diary entries also show participants recounting events involving older drivers and reporting that, despite experiencing anger and frustration, they refrained from an aggressive response because of the driver's age:

"Nothing. Because it was an older driver I left it" (Female, 21).

"I gasped at first, then realised it was an old lady and kept driving" (Female, 44).

This suggests that older drivers may be protected from driver aggression. In keeping with the suggestions offered by O'Brien and colleagues, a possible reason for this is that aggression against elderly drivers is not considered socially acceptable. Alternatively, consistent with Weiner's (2001; 2006) attributional theory, it may also be possible that elderly drivers are protected against aggression because

other drivers hold them as less accountable for their behaviour because of age-related changes; thus they may not be considered responsible for their behaviour.

Vehicle Stereotypes. Some remarks provided in diary entries suggested that participants' perceptions of the events they reported were influenced by the type of vehicle involved. This was particularly evident for two types of vehicles: Four-Wheel Drives or Suburban Utility Vehicles (4WDs or SUVs) and taxis, where comments that described apparent characteristics of those who drive such vehicles could be discerned.

Firstly, diary comments pertaining to events that involved 4WDs suggested that participants believed that drivers of 4WDsbehave as though the larger size of their vehicle affords them a unique set of rules, for example:

> *(Explaining why she was cut off) "Someone was in a rush and since they were driving a 4-wheel drive, they thought they had right of way, regardless of oncoming traffic" (Female, 27).*

> *"Driving a 4WD & thinking they thus have right of way" (Male, 33).*

While these comments illustrate a belief that drivers of 4WDs put their own needs above the needs of other motorists or the legal road rules, the use of the word "typical" in the following quote conveys the assumption that such behaviour is characteristic of those driving a 4WD. Furthermore, other material classified under this theme suggested that drivers of 4WDsare considered on-road bullies that use the larger size of their vehicle intimidate and harass other road users:

> *"A typical bully driver in an SUV" (Male, 61).*

Interestingly, a recent survey by AAMI (2013) suggests that this belief may not be unfounded. Specifically, the results found that drivers of 4WDs reported tailgating other drivers out of anger or impatience, yelling, swearing, and making obscene gestures towards other motorists, and described themselves as an impatient driver more often than drivers of other vehicles. Although the results of the AAMI survey, which were reported by 4WD motorists themselves, mirror participants' comments in the current study, the survey results must be interpreted with caution, as they were not peer-reviewed.

Secondly, negative attitudes towards taxi drivers were also apparent in diary responses with comments implying that drivers in the current sample believe that taxi

drivers are impatient and motivated primarily to obtain fares at the expense of others' safety. However, closer inspection of the responses classified under this theme appeared to indicate that these unfavourable views may reflect underlying racial prejudice, as they seem to be based on the assumption that taxi drivers are migrant workers who are unfamiliar with the Australian road rules. This can be seen in comments made by the following participant, who described the following event:

> *"Driving eastbound in M7 tunnel toward Brisbane airport. Tunnel is a 2 lane road. Bus was in left lane. I was beside bus in right lane. An impatient (speeding) taxi driver came up behind me wanting to pass. As there are speed cameras in tunnel, everyone is locked on 80km/h. As bus pulled ahead of me, taxi came up the left then started indicating right, even though I was right beside him" (Male, 45).*

These remarks clearly state that he believes the taxi driver is impatient and he mentions that the vehicle is heading in the direction of the airport, where taxis commonly travel. When asked to offer attributions regarding the cause of the event, the following response was provided:

> *"Impatience on part of taxi driver. He probably had a deadline & he probably has very poor driving skills. As do most of the (Indian) taxi drivers in Brisbane, Sydney, Melbourne..."*

This response is typical of those categorised in this theme: they imply a lack of skill and understanding of the Australian road environment, ostensibly because the drivers are migrants. Another participant reported witnessing what she perceived as racially motivated aggression directed towards a taxi driver. The following description of the event was provided:

> *"I was at a 4 way intersection in the right lane turning right, a taxi was in the left lane turning left. The left turning arrow turned green. Only a second passed, and one car honked, several other cars began honking without giving the taxi driver the chance to respond to the first honk. They continued honking until the driver was through the intersection" (Female, 35).*

She described feeling anxious and unable to determine why such aggression was being directed at the taxi driver for what appeared to be a very minor incident. She describes the other drivers as "aggro" (Australian slang for aggravated or

aggressive) and described feeling worried that it would culminate in a physical attack on the driver. She provided the following attribution of notable relevance to the current theme regarding why this event happened:

> *"It was racial, the majority of taxi drivers in my area are from overseas and have very basic English."*

The interpretation that negative attitudes towards taxis may be due to racial issues is further supported by two points. First, as noted in section 2.10.2, Sinclair (2013) highlights that driving behaviour can be influenced by wider societal attitudes and culture. In Australia, there is considerable empirical evidence demonstrating that unfavourable attitudes towards racial and ethnic minorities are widespread (Morris & Heaven, 1986; Schweitzer, Perkoulidis, Krome, Ludlow, & Ryan, 2005; Walker, 1994). As such, it is possible that the wider culture in Australia, which would appear to have negative attitudes towards racial and ethnic minorities, may also influence some driver's perceptions of provocative events that they encounter while driving.

Secondly, although not as common as reports about taxi drivers, there was some evidence in diary entries of negative attitudes towards minority drivers where the vehicle was not a taxi. For instance:

> *"She was Asian so I guess she was a new resident that doesn't know the rules and possibly doesn't even have a licence or even speak the language" (Male, 48).*

> *"I am getting tired of new drivers and immigrants stopping in front of me and pulling into my lane without looking for me" (Female, 45).*

Considered together, it is possible that negative stereotypes regarding the language and/or driving skills of migrant or non-native drivers may a source of anger and frustration for some drivers.

3.11.5. Theme Five: Regular events

The fifth theme has been labelled "regular events", to refer to a pattern observed in diary entries where events were described in terms of how frequently they occurred. This theme is most succinctly captured by the following quotation:

"Here we go again" (Male, 35;Female, 41).

That is, many of the events reported were described as being encountered with such regularity that they were now anticipated. Interestingly, comments made in the diaries concerning events that drivers described as being encountered regularly also appeared to describe their underlying reasons for why the event was regarded as negative in terms of how frequently they seemed to come across it. To illustrate, consider the following responses from drivers describing why they considered the respective events they reported on as the most negative on-road event experienced:

"It happens so frequently that it is an expected irritation" (Male, 61).

"Because it happens all the time at this intersection" (Female, 53).

Some important implications can be drawn from these remarks. Firstly, they suggest that certain events may be more salient to drivers as a function of how regularly they occur. This implication is in keeping with theories documented in section 2.2.4.2, as describing an event as negative because it is common may indicate a level of priming involved in perceiving road events: some drivers may be more sensitive to or alert to particular events if they are expecting to encounter them. Furthermore, consistent with Yagil (2001), describing an event as negative due to its frequency may also be indicative of a self-fulfilling prophecy. That is, due to the priming of the event in memory and the expectation that one will experience it, it is possible that encountering it becomes more likely, as one will be anticipating it. When the event is then subsequently encountered, the belief that the event in question is a common occurrence is reinforced.

Nevertheless, there were some comments provided in material classified under this theme to suggest that for some people, expecting the event to occur may be protective and may even mitigate an aggressive response, as shown by the following entries:

"Shook my head and continued on my way. What else to do? It happens so often" (Female, 51).

"Took a deep breath and rolled my eyes. I did this because this happens fairly frequently on this road, and it was an expected but annoying occurrence" (Female, 45).

3.12. Discussion

The preceding sections have documented the results of a content analysis and thematic analysis as part of the first study in the research. The purpose of the study was to contextualise the model by addressing gaps in knowledge concerning the cognitive processes in driver aggression and provide a foundation for the remaining research. The following section will provide a summary and discussion of these results, considering themes as they pertain to the research questions, and discussing theoretical implications as well as implications for the development of the model.

3.12.1. Discussion of findings in relation to research questions

The current study sought to explore Australian drivers' conceptualisations of driver aggression with the intention of generating new knowledge concerning the cognitive processes involved in driver aggression and gain information that will contribute to addressing the following research questions:

Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*

The information obtain in this study was able to provide some insights into the types of on-road events that were described as provocative by drivers. Firstly, drivers described experiencing negative emotions in response to on-road events they reported that they encounter regularly in their driving. As briefly described in section 2.10, this finding could be indicative of a well-rehearsed driving script embedded in memory, which may subsequently raise these drivers' expectations of encountering the event in question each journey. Moreover, this finding may have implications for a self-fulfilling prophecy. Yagil (2001) suggested a self-fulfilling prophecy underlying driver aggression based on findings that drivers who held a negative opinion of other drivers were found to report greater levels of driver aggression. In the context of the current findings, it is possible that drivers who expect to encounter a particular on-road event in their driving will be more likely to encounter it by virtue of this expectation: they may be more alert towards noticing events that are consistent with this expectation, which could serve to then further reinforce their belief that the particular event is common. Nevertheless, although many drivers in the study reported negative emotions stemming from regularly encountered events, its influence on anger and aggression was mixed: for some drivers, it appeared to

promote an aggressive retaliation, but for others, expecting to encounter the particular event appeared to decrease anger and aggression.

Further, the results suggest that on-road events involving certain types of drivers and particular types of vehicles may be perceived as provocations more often than others due to negative views and perceptions reflecting stereotypes about these groups. Stereotypes represent schemas of social groups that aid the processing and interpretation of one's social world by using simplified descriptions and categorisations of groups (Macrae, Mitchell, & Pendry, 2002; Tajfel, 1969, 1981). Stereotypes are often unflattering, and are anchored in clearly visible differences between groups. This was evident in the current study: drivers expressed negative opinions of p-platers, 4WD's, and drivers from ethnic backgrounds, groups that all have salient, visibly identifiable characteristics that distinguish them from other road users. Unflattering descriptions of these groups were also provided by participants, who referred to them as reckless, bully or incompetent drivers.

Of particular relevance to the program of research, drivers belonging to these stereotyped groups appeared to be a greater risk of having aggression directed towards them, based on drivers attributions for their behaviour that stemmed from these negative views (e.g., honking the horn at a p-plater whose behaviour was considered cutting off based on the assumption that p-platers are careless drivers). Additionally, there is evidence demonstrating that people can readily describe other people in terms of stereotype consistent information, but experience difficulty incorporating information that contrasts stereotypes (Haire & Grunes, 1950; Smith et al., 1982). Thus an implication of this for the current results is that drivers may be less likely to consider alternative explanations or attributions for drivers that they hold stereotypical opinions of. Further, these results may also have implications for a self-fulfilling prophecy: a driver who holds negative views about 4WD's may be likely to be more alert to the presence of 4WD's, and be apt to perceive their behaviour, which may be innocent, in manner that is consistent with their perceptions of them as bully drivers.

Alternatively, the results also suggested that holding negative views about older drivers may be protective. Despite describing the behaviour of elderly drivers as frustrating, drivers in the current sample reported that they refrained from aggressive retaliation, because they thought the drivers actions were a result of age related changes that arguably, they could not prevent. Thus it appears that older

driver's behaviour was not considered deliberate, and they were not considered responsible for it, which is consistent with Weiner's (2006) argument that aggression is more likely in instances where the attributions made an event hold another person accountable for causing it. To that end, on-road events where the behaviour seemed deliberate, in particular, deliberately rude or selfish was found to be a commonly reported as provocative, and appeared to be associated with driver aggression.

One of the most interesting and overt findings to emerge from the current study implied that drivers may have expectations for certain standards of etiquette from other motorists. Drivers appear to expect that motorists should be polite, courteous and respectful in their interactions with fellow drivers. However, the results also suggested that perceptions that a driver has deliberately behaved discourteously by being inconsiderate, thoughtless or selfish triggered anger and aggression for many drivers, thus representing a cognitive antecedent for driver aggression. Remarkably, descriptions of events as a violation of etiquette were evident even in instances where the event was also reported to be dangerous and involved a near collision: drivers in the current sample appeared to focus on the rude, inconsiderate elements of the behaviour rather than the danger or potential harm imposed by it.

The findings that drivers consider on-road events that they regard as violating expectations for etiquette counters some of the assumptions identified in the literature review that driver aggression is triggered by dangerous events. While drivers in the current study did describe some events as negative experiences because they were dangerous, the findings draw attention to alternative explanations. In fact, the results highlight that there are multiple ways the same event can be interpreted. To illustrate, as described in section 3.9.2, instances where a driver was reporting being cut off by another motorist were sometimes reported as dangerous, other times reported as rude: some drivers regarded the potential for a serious collision to be the negative aspect of the event, whereas others experienced believed the cutting off behaviour reflected selfish intentions of the motorist. This conclusion was further supported by the results of the content analysis: triggers classified as erratic driving were most commonly reported triggers, but the most commonly reported reason for why it was negative was because it was rude.

Additionally, the current results were also able to contribute towards gauging how prevalent events that trigger driver aggression may be. Over one week of regular

driving, only four percent drivers in the current study reported that they did not experience a negative event. Correspondingly, 96% of the sample was able to recall at least one negative event, even if only a minor provocation, with an average of five negative events reported during one week. Thus these results suggest that a large number of drivers may encounter even minor provocations quite regularly. Although it must be acknowledged that this high number may represent something akin to a Hawthorne effect whereby participant's behaviour changes by virtue of knowing they are being observed (Adair, 1984), these results appear to fit when considered alongside the self-reported prevalence of driver aggression. Driver surveys (Australian Associated Motor Insurers, 2011, 2013) have reported that up to 91% of drivers claim they feel aggression is common, and similarly, 96% of drivers in the current study report experiencing minor provocations in the space of one week of regular driving.

Furthermore, when breaking down the types of negative events reported in the diaries, the results suggest that the most common provocations are behaviours that were categorised as erratic driving, followed by events where a driver's progress was impeded and instances where a driver perceived they were cut off. Interestingly, reports that appeared to document rude or aggressive behaviours from another motorist accounted for a little over 6 percent of responses. Not only are these results able to provide an indication of the scope of provocative events that are reported, and how common these events appear to be, they have an important implication: provocative events may be widespread, and when further considered in conjunction with the results of the content analysis pertaining to the reasons why these events are considered negative, they suggest that perceptions that drivers do not display appropriate etiquette may be likewise widespread.

Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*

The results revealed some patterns in diary responses that appeared to highlight some beliefs that may increase, and in some instances, decrease the likelihood of driver aggression. Firstly, as described in the section above, beliefs or expectations about the frequency of particular events and negative or prejudicial beliefs about particular groups of drivers (identified in the current study as p-platers, 4WD drivers, ethnic minorities and elderly drivers) may influence driver aggression.

In particular, some drivers who reported experiencing negative emotions upon encountering the same types of behaviours reported a non-aggressive response. Furthermore, elderly drivers appeared to be protected from driver aggression, despite descriptions of their behaviour as frustrating. Alternatively, the other groups of drivers appeared to be at greater risk of having potentially innocent behaviour interpreted by others as reflecting aggressive intent, presumably on the basis of stereotypes, which may be perpetuated through a self-fulfilling prophecy.

In section 3.11.1, the notion of "driver etiquette" was described: the belief that drivers should be polite and considerate in their interactions with other motorists. That is, there appeared to be a belief, or perhaps an expectation that driver should behave in a certain way, in this instance, with courtesy and respect towards their fellow motorists. Moreover, perceiving that etiquette had been violated and this expectation was not met appeared to trigger anger and aggression. While these findings are certainly interesting, and would outwardly suggest that expecting appropriate etiquette to be displayed may increase the likelihood of aggression in response when it is not shown, a deeper reflection of the findings highlighted that this interpretation may be too simple. To elaborate, references to expectations for appropriate driver etiquette to be displayed were one of the most explicit themes that emerged in the diaries; however, the content analysis also showed that the most common reason cited for why an event was regarded as provocative was that it was considered it a violation of etiquette. Accordingly, if expectations for polite and courteous behaviour appear to be common shared expectations from drivers, questions are raised regarding why appropriate etiquette does not seem to be shown on the roads, despite this apparent shared expectation for it. It is well established within the scientific literature that individuals are more attuned to seeking out information is consistent with, or confirms their beliefs (Hart et al., 2009; Nickerson, 1998). Based on this evidence, if drivers expect courteous behaviour, they should be alert to instance that demonstrate it; however, the current results appear to suggest that drivers may focus their attention towards instances that disconfirm it. Thus although on the surface, drivers in the current sample may have made statements suggesting they expect good driver etiquette, perhaps another interpretation is that drivers may believe etiquette should be shown, but expect that it will not.

Additionally, some interesting patterns regarding the cognitions involved in the appraisal and attribution of negative events could be discerned. Drivers

commonly described their first thoughts about events as thoughts that mocked, judged and ridiculed the offending driver, and made internal, stable attributions of the offending driver to explain the event: that is, they believed the event was a reflection of the driver's inherent, dispositional characteristics. In fact, there was quite limited variation in the scope and type of cognitions reported. The frequency analyses suggested that cognitions pertaining to situational, external factors contributing to the event, or attributions that considered the participant's own role in the event were infrequent. Although on the surface, this lack of variation may be considered limiting, upon deeper reflection, it carries with it an important implication: drivers appear to be quick to judge and blame others for events on the road. Moreover, when these results are considered alongside the findings concerning the apparent purpose of drivers' aggressive as intended to modify the behaviour of the target motorist, an interesting paradox is evident: despite attributing the event to stable personality characteristics, drivers also appear to expect, or hope that aggressive retaliation will result in the target driver changing their behaviour.

Finally, an unexpected type of cognition that emerged was one that may be protective against driver aggression. Specifically, some drivers, despite reporting that they experienced anger in response to another driver's behaviour chose not to retaliate. An important subgroup described their response in terms of personal worth. Thus the superiority theme transpired from these responses, where drivers described feeling satisfied, or even superior, because they consciously chose to refrain from responding aggressively to the behaviour of a driver they used insulting, disparaging terms to describe. To the best of the author's knowledge, this is a novel finding in the driver aggression field and given that it may be protective, a discussion of relevant theories from moral psychology warranted.

3.12.1.2. Moral identity

Moral psychology examines the social, cognitive and emotional processes that underlie moral judgements, decisions and behaviour (Lapsley, 1996). Historically, the field has focused on understanding moral reasoning; the processes involved in making moral judgements and decisions. However, reflecting more recent arguments that how important morality is to an individual's identity is a strong determinant of moral behaviour, more recent work is concerned with the notion of moral identity (Blasi, 1983, 2004; Monin & Jordan, 2009). Moral identity refers to the way in

which one mentally represents one's own moral character. It is conceptualised as a schema reflecting how dominant or important moral behaviour is to one's identity, and expressed externally through actions (Aquino & Reed II, 2002b; Winterich, Aquino, Mittal, & Swartz, 2013a).

There are multiple approaches to the study of moral identity within the literature; however, germane to the current results is the moral centrality approach (Monin & Jordan, 2009). The moral centrality approach conceptualises moral identity as consisting of two dimensions: moral self-importance (internalisation) and moral symbolisation (Aquino & Reed II, 2002b; Monin & Jordan, 2009) Moral self-importance reflects the extent to which one internalises and values moral behaviour, and moral symbolisation denotes the extent to which one views the world from a moral standpoint, that is, the extent to which an individual externalises and displays morality (Reed II & Aquino, 2003).

Accumulating evidence from moral psychology indicates that a salient moral identity is associated with a greater tendency towards prosocial behaviours (Shao, Aquino, & Freeman, 2008; Winterich et al., 2013a; Winterich, Mittal, & Aquino, 2013b). This is consistent with the current results, where moral overtones from drivers who described feeling superior because they refrained from an aggressive response could be discerned. Specifically, while numerous studies have found that moral internalisation is a robust predictor of prosocial behaviour in a range of situations, evidence concerning the role of moral symbolisation in prosocial behaviour is mixed. Winterich et al (2013) found that moral symbolisation was as strong of a predictor of prosocial behaviour as internalisation in situations where individuals expected to be rewarded or recognised for their prosocial behaviour. In the context of the current results, it is possible that knowing that the diary would be read by the researcher, that some participants whose diary remarks formed the moral superiority theme considered the diary as an opportunity to externalise and display their morality, by noting their own good behaviour.

Moreover, moral identity may be implicated in the teaching them a lesson and driver etiquette themes. Specifically evidence from moral psychology indicates that a strong moral identity is associated with greater and more severe criticisms of other's negative behaviour, particularly when the behaviour in question breaches or disregards common moral values (Lee, Winterich, & Ross, 2014; Wiltermuth, Monin, & Chow, 2010). This was certainly evident in the current results, where

drivers whose responses formed this theme used derogatory words such as idiot or ignorant to describe the offending driver's behaviour. However, it is recognised within moral psychology that variations exist in the way moral transgressions are responded to by those with a strong moral identity: some people appear to 'take the moral highground' and simply ignore the behaviour, whereas others appear to seek retribution and see retaliation as a remedying it and restoring moral order (Barclay, Whiteside, & Aquino, 2014). A more recent line of investigating in moral psychology focuses on establishing what factors can predict whether someone with a strong moral identity will take the moral highground or seek revenge, with evidence indicating there may be an association with endorsement of the reciprocity norm, the belief that one should 'do unto others as they do unto you' (Barclay et al., 2014).

This literature has strong parallels to the findings of the current study: some drivers appeared to take the moral highground by not retaliating to another driver's behaviour, even though it appeared to provoke negative emotions, whereas others appeared to feel an obligation to alert the driver to their bad behaviour, perhaps as a way of restoring order. Moreover, in the current study, perceiving that etiquette had been violated emerged as a common trigger for anger and aggression and when examined closely, etiquette and morality are closely related principles. Common perceptions of what constitutes good moral behaviour typically emphasise treating others with respect and consideration, which is consistent with notions of what constitutes good or proper etiquette or manners: showing respect or consideration towards your fellow man (Buss, 1999). Thus it is possible that violations of driver etiquette also violate moral principles, which are responded to either by taking the moral highground or seeking retribution. Considered collectively, an individual's moral identity may have important implications for their behaviour on the road and thus moral identity represents an avenue of exploration for its role in driver aggression.

Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

Aggressive responses, where drivers described the purpose of their response as being to criticise, scare or antagonise the target, constituted approximately a quarter of the described behavioural responses. Encouragingly, the most common behavioural response to events generally involved venting frustrations within the

confines of one's' vehicle or taking action to remain safe. Consistent with the definition of driver aggression used to guide the current research, these behaviours cannot be meaningfully considered aggressive, because the intention appears to be releasing one's own frustrations without inflicting harm on the other driver. However, evidence documented in section 2.2.3.4 indicates that venting behaviours increase anger and aggression in response to subsequent provocations. As such, although these drivers may have reported venting behaviours in response to the reported event, they may have inadvertently been priming themselves for an aggressive response later in their journey. Moreover, only 12% of diary entries reported an absence of a behavioural response, suggesting that most drivers will take some action in response to negative events on the road rather than let it go.

Interestingly, when the results concerning the prevalence of behavioural responses to provocative events in the current study are considered alongside the results of self-report surveys that indicate that most drivers believe aggression is increasing on the road, a possible explanation can be proposed. To elucidate, it is likely that rather than defining driver aggression in the same way as the current research does, most drivers are instead, are likely to consider driver aggression to simply be experiencing anger when driving. Therefore, they may consider themselves as "aggressive drivers" because they experience anger when they drive when in actuality; their behaviours may not be intended to harm another motorist. Thus, some drivers who described responses that were regarded as venting and, therefore, non-aggressive in the current study, may define themselves as aggressive drivers when responding to self-report surveys as conducted by AAMI (2011) and GIO (2011). As such, based on the definition of driver aggression employed in the current research, it is possible that the self-reported prevalence of driver aggression may be higher than it actually is. Nevertheless, based on concepts espoused in social identity theory (Hornsey, 2008; Turner, 1999) that self-categorisation has important influence on behaviour, regarding oneself as an aggressive driver may promote behaving in ways that are consistent with this identity.

To that end, it must also be acknowledged that participants' understanding of what constitutes driver aggression may not have reflected the definition of the concept that was used in the present research. Participants were given instructions regarding the types of events they should consider reporting (see section 3.6.3). However, so as to not further pre-empt, or pre-determine what participants would

report, participants were not provided with the exact definition of how 'driver aggression' was to be conceptualised in the current research; instead, participants were instructed to simply report upon 'negative events'. Although there was benefit in not pre-defining and potentially limiting participants in what they may have been prepared to discuss as instances of aggressive driving, it must be recognised that participants' description of their responses were categorised as aggressive or not were based solely on the interpretations of the thesis author. Consequently, it is possible that some behaviours that were categorised as aggressive based on the current definition may not have been intended to be aggressive by the participant reporting them. Alternatively, it is also possible that some behaviours reported by participants (e.g., weaving, overtaking, speeding etc.) that were not categorised as aggressive in the current study were, in fact, considered aggressive by the participants reporting them. Therefore, while it possible that self-report surveys like the ones cited in the above paragraph may overestimate the prevalence of driver aggression, it is also possible that prevalence of driver aggression reported in the current study may be inaccurate. As noted in section 2.4.1 a seminal article by Dula and Gellar (2003) called attention to the substantial variation in the definitions of driver aggression used throughout the research, and highlighted that it makes prevalence rates difficult to establish, and comparisons across studies problematic. As such, the potential discrepancy between the current results and previous findings further highlights the need for a consistent definition of driver aggression to be adopted.

Furthermore, the results also drew attention towards the underlying aims, or purposes of aggressive driving behaviours. Specifically, the results suggest that for some drivers in this sample, the purpose of their response was to convey shame, criticism and disapproval as justified retaliation, to teach the target driver a lesson regarding their behaviour. These behaviours can be considered aggressive based on the current definition of driver aggression, because these behaviours appear to be intended to harm another motorist. Further, the conclusion that some drivers intend to "teach a lesson" with their aggressive responses is consistent with evidence from Lennon and colleagues (2011), and further with Weiner's (2001; 2006) theory that the likelihood of aggressive behaviour is increased where the aggressor makes attributions of responsibility: that is, they consider the target to be responsible and retaliation is thus considered justified. Supporting Weiner's theory, and further

relevant to the current results, Dodge (2006) argues that attributions where another person is considered responsible for the behaviour carry with them the insinuation that the person was deliberately neglectful. Specifically, Dodge states that such attributions imply that:

> "a peer paid insufficient attention to the self, that a peer placed her or his own perspective above that of the self, that a peer failed to plan ahead to see the potential consequences of his or her actions, and that a peer acted irresponsibly… the principle seems to be that if the peer's actions lead to the self's harm, the peer is, by default, culpable unless a plausible mitigating explanation is identified" (pg. 800).

Consistent with these remarks, although there were some instances in the current study where it was apparent that drivers were able to identify mitigating factors to explain the events in question, overwhelmingly, participant drivers held another motorist responsible for the negative events they were describing, particularly where the event involved a perceived violation of driver etiquette. As section 3.11.1 shows, many drivers reported experiencing anger, annoyance and/or frustration when they believed another driver had put their own needs above those of others in a way that directly and negatively affected them. For instance, cutting off behaviours, particularly in situations that involved heavy traffic were often described as inconsiderate and as failing to wait one's turn in traffic. Thus consistent with Dodge's arguments, based on these perceptions and the emotions they generated, they are likely to hold the offending driver responsible for what they believe is unfair or unjust treatment, and may respond with aggression. When the themes of driver etiquette theme and the teaching them a lesson theme are considered together, a potential relationship is apparent: drivers may teach other drivers a lesson to communicate their disapproval of the other's poor etiquette, and to send them a message that they ought to behave with more courtesy. However, as was noted earlier, a contradiction is apparent in that drivers seem to hope their aggressive behaviour would change another motorist's behaviour, yet attribute such behaviour to stable personality characteristics.

In addition, the findings that the purpose of driver's aggressive behaviours appears to be to "teach them a lesson" could also be interpreted as fitting with the small body of research investigating vengeance in driver aggression (see section 2.10). Vengeance refers to attempts to rectify a perceived interpersonal transgression

through the use of pain, harm, embarrassment or aggravation directed at the offender (McCullough et al., 2001). Consistent with this, it is possible that for some of the drivers in this study, that their aggressive responses were motivated by a desire to seek retribution for the rude or discourteous treatment that they perceived they had experienced. Nevertheless, there did appear to be some differences between the comments classified as 'teaching them a lesson' in the current study and vengeance. Although it is possible that drivers in the current study may have been seeking retribution, it did not appear to be the only motivation as they also appeared to hope that their aggression would modify the target driver's behaviour. It is in this sense that these participants' aggressive acts can be regarded as a form of positive punishment whereby an aversive stimulus is delivered to reduce the likelihood of the behaviour occurring in future. To that end, the research that has been conducted on vengeance in driver aggression has found that drivers with more vengeful attitudes tend to report greater levels of driver violence. As such, it is possible that vengeance is predictive of violent driver aggression, teaching them a lesson may be associated with non-violent driver aggression.

Further, examining content coded under "teaching them a lesson" theme also elucidated some of the psychological processes that may be involved in escalation: drivers who recounted instances of escalation stemming from their own aggressive behaviour in response to a driver they perceived had behaved inappropriately also described feeling criticised and indignant when the target motorist returned their aggression. Their descriptions contained evidence that these drivers felt unjustly criticised when their lesson was countered with aggression. Based on accounts provided in these diaries, the other driver involved appeared to believe the same thing: that the participant was the one behaving incorrectly, they were obliged to tell them that.

One interpretation of this is that escalation is essentially an impasse between two drivers, each trying to, and feeling entitled to communicate their own views to the other and feeling unjustly criticised by the target driver's response. Supporting this interpretation, feeling that one's own driving behaviour has been criticised is consistent with evidence cited in the literature that aggressive behaviour often results from situations where ego is threatened (Baumeister et al., 1996; Feshbach, 1970). When the current results are considered in light of this and the evidence provided in section 2.4.2 that many drivers consider themselves to be more skilled than most

other motorists, a possible explanation of escalation is apparent: drivers may be responding aggressively to what they perceive is an attack on their driving skills, and thus may experience a threat to their ego, stemming from the apparent attack or criticism of their driving ability. This also points to the issue of the victim-perpetrator overlap: most victims are perpetrators because they perceive themselves to be the victim of an unjustified attack, instigated by the other driver. This highlights a complex relationship between victimisation and perpetration, as it suggests that the roles are fundamentally in the eye of the beholder. Further and arguably more importantly, it suggests that driver aggression is an ineffective attempt at behaviour modification.

3.12.2. Implications for the model

Consistent with the study aim, the current results provide a context for the remaining research by shedding light on some of the beliefs and cognitions that may be at the core of driver aggression and have not previously been explored. It has shown that although aggressive behaviours may not be particularly widespread, most drivers will generally engage in some kind of response when they experience anger on the road. Although the most commonly reported response to negative events were venting behaviours, which do not fall under the definition of aggressive driving, implications for the model are apparent. To explicate, the reader is reminded of evidence presented in section 2.2.3.4 demonstrating that despite popular belief, venting behaviours promote further aggression and anger rather than extinguish it. As such, although a well-intentioned driver may respond to an on-road event by venting their frustrations aloud within the confines of their vehicle, believing they are releasing their negative emotions, they are likely to be increasing their future likelihood of experiencing anger or frustration in response to subsequent events they may encounter in their journey, and to which they may respond with aggression.

Additionally, the results draw attention to some cognitive antecedents that may be key to understanding driver aggression. Firstly, results suggest that many drivers take to the road with the belief that drivers should display good etiquette towards fellow motorists, by showing them consideration and respect. However, perceptions that another motorist failed to display appropriate etiquette was often reported as a trigger for aggressive behaviour, suggesting that cognitions may trigger aggression. That is, the results in this study emphasise the importance of the meaning

a driver attaches to an event and the potential for this interpretation to act as a trigger for aggression or retaliation.

Further, the results suggest that drivers are generally quick to attribute blame to other motorists for provocations they experience on the road. As described above, holding another driver culpable for provocative events can increase the likelihood of aggression. Thus these results reinforce the importance of the appraisal stage of the model. Moreover, the results have implications for the model, as they highlight the potential for a self-fulfilling prophecy involved in perpetuating aggressive driving behaviour: drivers' beliefs and cognitions about driving may influence what events they perceive as triggers in the first place, by unconsciously raising their expectations for experiencing these events.

Additionally, the findings emphasise the importance of cognitive appraisals, by highlighting different ways in which they same provocation can be perceived. This finding has implications for interventions to address driver aggression, as they highlight that a broad, singular approach would not be suitable based on different interpretations of the same event: arguably, a driver who regards an event as dangerous rather than rude will have different motivations for any subsequent aggressive response, which will need to be taken into consideration when planning interventions.

Lastly, the findings concerning the purpose of driver's responses to provocations have implications at the decision stage of the model. Specifically, they suggest that those drivers who appear to believe that motorists who behave poorly should have their behaviour brought to their attention are more likely to engage in aggression to teach the offending driver a lesson, whereas those who appear to believe that retaliating with aggression would demean them seem likely to refrain.

Considered collectively, these results highlight that the internal processes that mediate behaviour are important in driver aggression. The ensuing studies will expand on this and explore these findings in more depth to consider what factors influence whether an event is perceived as a violation of driving etiquette and/or deserving of a lesson before the final study conducts a preliminary investigation of the key constructs of the model, to examine its utility.

3.12.3. Strengths and limitations

There are several strengths to the current study that should be highlighted. First and foremost, this study explored a previously under-investigated area by examining drivers' beliefs and attitudes about their experiences with driver aggression to understand how these influence appraisals, and to explore the association with aggression. Further, reflecting the research aim of exploring the utility of a model for understanding driver aggression based on the GAM, there was a strong theoretical basis underpinning the study. The GAM has been recognised for its potential to explain aggression in the driving context by drawing attention to the role that cognition play in influencing behaviour. Accordingly, the current study focused on understanding and identifying ways that drivers interpret and appraise events in their driving environment, in order to contextualise the model and guide the remaining research.

The use of qualitative techniques constitutes a strength of the study. As noted earlier, any studies on driver aggression adopt scenario-based methods, which have limitations relating to social desirability and external validity, and were not considered appropriate given the aims of the study. Instead, qualitative techniques, which provide a tool for understanding social phenomenon from the perspective of those who experience it, were adopted to generate new knowledge regarding Queensland drivers' lived experiences of driver aggression. In doing so, the study was able to gain insight into the cognitive processes involved in driver aggression. To that end, an additional strength is the use of a unique qualitative technique: online diaries. Online diaries allowed participants to provide their innermost thoughts regarding the incidents they encountered, without the influence of the physical presence of the researcher or other research participants to bias responses.

Nevertheless, there are limitations that should be recognised. Most importantly, it is acknowledged that as discussed in section 3.5, the above findings are based on the interpretations and conclusions drawn predominantly from one person, namely, the thesis author. Although a second researcher was recruited to assist in enhancing the reliability of the coding frame developed for the content analysis, the thematic analysis was based entirely on the author's own analysis, in consultation with the supervisory team.

It must be acknowledged that although measures were taken to reduce the influence of personal biases potentially exerting some influence upon the research

process, as the researcher is part of the research process it is impossible to completely remove all potential influence. For instance, the research required participants to provide their interpretations and perceptions of a negative event. As described above, these reflections of events often contained quite judgemental remarks about other drivers. Given that the research was conducted within an interpretive approach, the author of this thesis (who conducted the thematic analyses and conducted the content analysis in conjunction with an independent research assistant) was often making interpretations of comments that were often judgements regarding other drivers. For instance, many of the comments provided as example quotes in the preceding results (e.g., "typical bully driver in an SUV", "where did this k**b learn how to drive" and "any further action is dangerous and pointless and would make me on the same ignorant level") can be regarded as quite judgemental. Such comments appear overly critical and describe the drivers in question using derogatory terms. Therefore, in the interest of transparency, it is possible that in analysing the responses that the participants' judgement of the driver(s) involved in their negative interaction may have inadvertently influenced the author's interpretations of these comments which must be recognised as a limitation.

Second, although careful consideration was given towards the design of the study, it is recognised that all study designs have their relative strengths and weaknesses. In terms of weaknesses, the following aspects are acknowledged as limitations. First, the study was self-report, and much evidence exists which addresses the potential limitations associated with self-report data such as self-presentational biases, acquiescent and extreme responding (Chan, 2009; Paulhus & Vazire, 2007). Second, it is possible that a Hawthorne effect may have influenced participants' behaviour such that their behaviour changed by virtue of knowing that their driving behaviour was being studied (Wickström & Bendix, 2000). For instance, the study's instructions explicitly told participants that they should not report violent events. This instruction was added given that non-violent driver aggression (as opposed to violent driver aggression) was the focus of the research; however, it is possible that these instructions may have 'scared' some drivers from reporting events that may be illegal (e.g., speeding), but not necessarily a serious criminal offense. It is in this sense that studies like that by Wickens (2013) (described in section 2.6), which analysed internet posts about driver aggression, are advantageous, as they would not have contained instructions like these. However, an

analysis of internet posts would not have been appropriate for the current study, where the aim was to explore internal thoughts in relation to provocative driving events. Therefore, the potential impact of the need for these explicit instructions needs to be recognised. Third, as acknowledged in section 3.4, because the study was conducted online, there is a potential that doing so introduced a sampling bias whereby participants without access to the internet were unable to participate.

Finally, there are limitations that must be recognised regarding how disagreements between the two raters in the content analysis (the author of the thesis and an independent research assistant) were handled. Responses where the two coders could not reach an agreement were coded as 'other' in the current study. Ideally, a third rater could have been brought in to assist in these instances, however, time and budgetary constraints prevented this. Although this limitation must be acknowledged, it must also be recognised that there was only a small portion of responses where agreement could not be reached. As described in sections 3.9.1 through to 3.9.5, for each set of diary question responses analysed in the content analysis, there were only approximately 10 out of 156 where the two raters could not agree. As such, the impact of this limitation is not thought to be pervasive, but must be recognised nonetheless.

Some limitations of the current study have been mentioned previously: the potential misinterpretation of a diary question by participants and the significant decrease in the number of negative events reported in each consecutive diary entry. Concerning the former, although the diary questions were piloted, the question regarding why the event was considered negative was often responded to in a way that suggested the question could have been misinterpreted. The question asked "off all the interactions you experienced, why do you regard this one as the most negative?" This was intended to ask participants why they chose to report this particular event over and above any other events they had experienced on the road. That is, why they considered that particular event to be negative. However, many people responded to the question to indicate they had only experienced one negative event in the past 48 hours. Based on these responses, it can be speculated that some people interpreted this to mean "of all the *negative* interactions you've experienced, why do you regard this one as the most negative" rather than focusing on *all* interactions. This is understandable, and upon reflection, it is evident that the question could have been worded more precisely. Although this question still

generated many meaningful and insightful responses from those who did not misinterpret it, the possibility that those who did misinterpret it may have had valuable additional insights to add represents a limitation. Further, there are limitations stemming from the use of multiple time points to record diary entries, as reflected by the statistically significant decrease in the number of events being reported. Although it is certainly possible that this successive decrease in negative events being reported is an accurate reflection of participant experiences with aggression, it also must be considered that decline in negative events reported occurred simply because participants became familiar with the diaries or simply grew tired of them.

To that end, although the results do show a decline in the number of events reported, the use of repeated diaries may have also inadvertently increased the number of negative events reported in each diary: after completing the first diary, participants knew what to expect, and thus could have been more attuned towards negative events on the road. This was in fact expressed by one participant, who remarked in their final diary that their first thought in response to an event was:

"Concentrate, this an interaction for the survey I'm doing" (Female, 58).

Thus although it is possible that the repeated diaries may have become burdensome for some participants, resulting in a decrease in the number of events reported, others may have become more vigilant in looking out for negative events, noticing events that they may not have otherwise.

Finally, there is the possibility that there was selection bias in the sample. Although care was taken to ensure that materials advertising the study did not directly refer to or advertise the study's interest in aggression, it is possible that some participants may have inferred it from the material provided. Therefore, those who responded to the advertisements may have been those who were either particularly attuned to aggressive cues, or saw the study as an opportunity to vent their frustrations about driver behaviour.

3.13. Chapter summary

The preceding chapter has documented the first study in the program of research, a large-scale qualitative investigation designed to explore Australian drivers' encounters with, and perceptions of driver aggression. The study employed a series of the three structured driver diaries delivered online, with each diary question

designed to tap drivers' cognitions at each stage of the proposed model. Diaries were considered the most appropriate qualitative technique to minimise the self-presentational biases that can pervade traditional qualitative methods, and thus facilitate an open and honest account of driver experiences with aggression. The results of a thematic analysis and a content analysis conducted on diary responses were presented, followed by a discussion of these findings in the context of the research questions and the proposed model. The ensuing chapter expands on the current study to present the results of a more in-depth and concentrated qualitative interviews study with a subset of drivers who participated in the current study.

Chapter 4: In-depth follow-up interviews with selected drivers

4.1 Introductory comments

The ensuing chapter documents the second study in the program of research, in-depth follow-up interviews with a subgroup of drivers who participated in the driver diary study outlined in the preceding chapter. The diary study adopted qualitative methods to begin addressing gaps in knowledge regarding cognition in driver aggression, by investigating how drivers conceptualise their experiences with, and their thoughts about, driver aggression. While the diaries were able to offer a snapshot of the experiences of a large and diverse range of motorists, they only capture the brief descriptions provided by these drivers and do not allow for further exploration of, or insight into any interesting facets that emerged, nor do they allow for clarification regarding the events reported. Considering the aim of the program of research is to investigate the potential of the proposed model of driver aggression, a deep, rich insight into drivers' cognitions was considered crucial. A rich understanding of these processes will not only help to address gaps in current knowledge regarding cognition in driver aggression, it will provide a strong basis for the final study to conduct a preliminary investigation of the model. Accordingly, follow-up interviews were conducted with a small number of carefully selected diary participants. By combining the breadth of information provided in the diaries with the depth of knowledge that can be obtained in interviews, the second study was able to augment the understanding gained in the diaries to achieve a richer and more comprehensive understanding of the cognitions involved in driver aggression.

4.2 Purpose of the study

Current understanding regarding the role of cognition is driver aggression is limited. The purpose of the follow-up interviews was to allow for investigation of negative driving events reported in the driver diaries in greater depth. This was done to clarify the apparent underlying cognitions associated with these events and explore the beliefs that informed them with a view to extending and enriching understanding of important cognitions at key constructs of the proposed model.

4.3 Study aims

Although the diaries provided the foundation for the second study, the interviews adopted a more focused approach by specifically seeking information relating to cognitions at key constructs of the model. However, the study endeavoured to remain exploratory, to allow for the exploration of unexpected findings. As such, it did not seek to test specific hypotheses, but rather, aimed to provide information pertaining to the following research questions:

- Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*
- Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*
- Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

To generate information that would add to and complement the information pertaining to these research questions, several lines of enquiry, each reflecting a key stage of the model, were explored:

- Identifying and exploring any general, enduring beliefs that drivers may have that may influence what events are perceived as provocations;
- Exploring how any identified beliefs influence the perceptions and appraisals of negative events;
- Identifying any characteristics about on-road events that influence drivers perceptions and appraisals of on-road events;
- Exploring motivations for, and purposes of both aggressive and non-aggressive responses to on-road events; and
- Exploring drivers' thoughts and feelings following an aggressive response, and exploring how they may affect escalation.

4.4. Study design

As stated, the goal of the second study was to enhance the information provided in driver diaries to enable a richer and more robust understanding of the cognitions involved in driver aggression, focusing on key constructs of the model. This was achieved using in-depth, semi-structured interviews. Qualitative interviews consider

that people have valuable information regarding their social world that can be learnt through guided discussion with them and are intended to obtain deep information regarding the phenomenon of interest, from the perspective of selected individuals (Nagy Hesse-Biber & Leavy, 2006). Accordingly, interviews were considered to be the qualitative method that best aligned with the goals of the study.

Purposeful selection from the larger pool of drivers who had completed the driver diaries was employed in the second study. As section 4.6.1 will describe, diary participants were required meet certain criteria in order to be eligible for an interview. These criteria pertained to whether or not the participants' diary recollections indicated that they could potentially have deeper information to offer that would elucidate thought processes at each stage of the model.

4.5 Approach to the data

As recognised in section 3.5, interpretive approaches to qualitative data are consistent with the aim of the research and thus were embraced in the current study. Interpretive approaches highlight an indivisible relationship between an individual and his or her lived experience of the world, based on the core assumption that social meaning is derived from interactions within the social world (Nagy Hesse-Biber & Leavy, 2006; Patton, 1990; Sandberg, 2005). Thus interpretive perspectives emphasise the meaning that individuals ascribe to their social interactions to make sense of them with a view to recognising or highlighting shared lived experiences.

The second study was also regarded as way of providing a degree of triangulation (Patton, 1990). Triangulation refers to the process of using and blending multiple methodologies to investigate the one phenomenon and using several sources of information to generate an understanding of it (Denzin & Lincoln, 2008; Jick, 1979). Specifically, triangulation examines findings regarding the same phenomenon obtained via different methods. Qualitative literature often describes triangulation as a technique used to assess validity or to verify findings (Grafanaki, 1996; Jick, 1979; Sandberg, 2005). However, reflecting the assumptions that underpin interpretive approaches, Denzin and Lincoln (2008) highlight that what constitutes reality is in the eye of the beholder and thus cannot be captured nor truly verified. It is in this sense that triangulation is consistent with the goal of the second study; Denzin and Lincoln (2008) and Glaser and Strauss (1965b) argue that triangulation is best conceptualised "a strategy that adds rigor, breadth, complexity and richness" (pg.7) to an

investigation. As such, the interviews were regarded as an opportunity to enhance the depth of knowledge regarding cognitions in driver aggression rather than as a method of confirming or validating findings.

As discussed in section 3.5, the researcher is considered to be inextricably intertwined in the research process and thus the bearing that the researcher brings to the research process must be recognised. Similar biases and issues to those identified and discussed in section 3.5 in connection with the first study apply to the second study: the researcher herself is a very experienced licenced driver and consequently has had her own experiences with on-road anger and has developed her own beliefs and opinions. For a more detailed explanation regarding how the influence of these potential biases were minimised throughout the research process, the reader is referred to section 3.5.1. However, as the second study utilised interviews and thus required interaction with participants through telephone discussion, the author endeavoured to adopt a stance of empathic neutrality (Ritchie & Lewis, 2003).

Empathic neutrality refers to conducting research in an open-minded and non-judgemental manner, where the researcher shows "empathic engagement with the stories the participants share, but neutrality regarding the content of the material generated" (Grafanaki, 1996, pg.7). A stance of empathic neutrality was considered to be exceptionally important in the context of the second study, where some participants were selected for interviews, because they reported an aggressive response in their diary. By approaching the interviews from a stance of empathic neutrality, the author endeavoured to remain neutral and open to hearing the thoughts of those drivers interviewed, while remaining respectful to diverse opinions. To illustrate, one participant described feeling pleased by his actions that almost caused a head on collision between two drivers. However, by consciously refraining from making comments or asking questions that would have implied judgement regarding his action (e.g., "were you at all concerned about causing a collision" or "were you worried about the other drivers?"), probes, such as "that's interesting, can you recall how you were feeling at the time?" or "is this how you would typically respond to similar events?", were used instead to continue to stimulate the conversation and draw out relevant information.

4.6 Method

4.6.1. Participants

Prior to consenting to take part in the diary study, participants were advised that they may be invited for a follow-up interview to discuss diary events in more depth. There was an additional monetary incentive for participation in a follow-up interview; therefore, to avoid potential biases or deliberate falsifications in diary responses from participants who may have wanted to be selected, participants were led to believe that interviewees were selected at random. In reality, interview participants were chosen on the basis of a set of selection criteria that were developed to help ensure that participants were selected in an objective manner. These criteria pertained to the behavioural responses participants described to the events reported in the diaries. It was anticipated that selecting participants on the basis of their reported behavioural responses would provide an opportunity to probe their thought processes at each key stage of the model, thus helping to enhance understanding of cognitions underlying both aggressive and non-aggressive behavioural. To be selected for an interview, participants had to meet at least one of the criteria listed in Table 4.1. It was also possible for a participant to give more than one interview should they meet different criteria on different diarised occasions. To help ensure the criteria were applied objectively, a research assistant that was kept blind to the aims of the research was employed to monitor diary submissions and identify potential participants using the criteria provided.

Table 4.1. Criteria for diary follow-up interview.

1.	Did the participant's account of the event indicate that it escalated?
2.	Did the participant report a behavioural response that appeared to be aggressive (intended to harm, criticise, threaten, or insult) the target driver?
3.	Was the participant's behavioural response risky (in that it elevated crash risk?)
4.	Did the participant report a prosocial or non-aggressive response to an event that might generally be responded to with aggression? (e.g., tailgating, cutting off)
5.	Based on their account, was the participant reporting an event where he or she was victim of someone else's aggressive behaviour?

To limit the effect of declines in memory recall, participants were advised that interviews must be conducted within 48 hours of the diary being received. To facilitate conducting the interviews in a timely manner, the diaries required participants to indicate suitable times when they would be available for an interview. This assisted

the author and the research assistant to identify participants that met one of the selection criteria and had suitable availability. Diary submissions were monitored by the author and research assistant three times daily to ensure that recent diary entries were read promptly and potential interview participants identified efficiently. Once identified, participants were contacted via email with a time proposed for the interview and were required to confirm their participation via return email. From this process, 31 drivers were approached to take part in an interview with only two declining: one selected participant failed to respond to the email request for an interview and the other cancelled the interview, which could not be rescheduled within the required timeframe. Thus 29 drivers (23 Female, 6 Male) completed a follow-up interview. As can be seen, females were overrepresented in the sample (this limitation is discussed further in section 4.8.3). Demographic characteristics of this sample mirrored those of the driver diary participants: the mean age of interview participants was 40.00 (*SD* = 14.14), they had approximately 21 years driving experience (*SD* = 14.82) and drove for an average of nine hours each week (*SD* = 5.9). Interviews were conducted by phone and were recorded with participants' verbal consent. Participants were thanked for their time at the end of the interview and provided with an additional $10 gift voucher upon completion of all study materials (including any subsequent diaries requiring completion).

4.6.2. Materials

Semi-structured interviews were employed for two key reasons: to ensure that relevant information relating to each key component of the model was obtained and to facilitate free-flowing dialogue between the participant and researcher.

To ensure that the questions generated the appropriate information, a series of standard open-ended interview questions were devised that guided participants through questions reflecting each stage of the model (see Table 4.2). The first questions were intended to contextualise the interview, by encouraging participants to provide a verbal account of the provocative event described in their diaries. Prompts for this question focused on recalling precursors to it and clarifying the situation that was occurring in the lead up to the event. Following this, imagery techniques were adopted to assist in enhancing recall and recollecting the cognitions and emotions participants had experienced as the event took place. For instance, the interviewer requested that participants close their eyes and guided them to visualise themselves in

the same situation they had just described, by paraphrasing and repeating the information they had provided earlier in the discussion. Prompts at this stage encouraged participants to recall the first thoughts they had in response to the event, the emotions they were experiencing, and their attributions for the event.

Next, participants were asked about their behavioural response (or lack thereof) to the event with the questions designed to elaborate on the reasons why they responded the manner they described in the diary. Prompts to elicit more information included asking participants about the intended purpose of their behaviour, their feelings after responding, how they typically respond to similar events, and their fantasies about how they would have liked to respond. Finally, to complete the interview, participants were asked to discuss their general thoughts about driving. Throughout the interviews, the author used reflection of meaning to sum up what participants had discussed and reflect it back to them to ensure that the understanding was accurate and to allow them the opportunity to clarify if necessary. Before each interview, the author reviewed this schedule of questions to adapt it to suit each interviewee as appropriate, making sure to include questions relating to any interesting remarks made in the diary.

Table 4.2. Basic schedule of interview questions

Question	Prompts	Part of model
Could you please start by telling me about the event?	• "Could you tell me a little bit about your day before you began driving?" • "Had you been doing a lot of driving before this event happened? Is this amount of driving normal for you?" • "How were you feeling as you were driving before this event happened?"	• Initial events. • Situational factors.
Close your eyes and imagine you are driving down that same stretch of road *(paraphrase recollection of events given to the questions above back to them).* How you are feeling at that moment?	• "What are the very first, initial thoughts that are going through your head?" • "What other thoughts do you recall having?" • "What emotions are you experiencing?" • "How would you describe your mood?" • "Why do you think event happened?" "What do you think caused it?" • "What is it about this event that bothered you?"	• Perception. • Cognitive and emotional appraisal.
Now imagine that you are about to respond to this event *(paraphrase recollection of events given to the questions above back to them).* Why do you think you responded in this way?	• "What were you hoping your response would achieve?" • "How did you feel after responding in this way?" • "Is this how you might typically respond to something like this?" • "You've indicated that you would have liked to (desired response), but instead you did (actual response). What stopped you from doing this?" • (For non-aggressive responses only) "Why did you decide to continue driving?"	• Decision processes. • Behavioural response. • Behaviour of other road user.
General driving questions.	• "What do you like most and least about driving?" • "Would you describe yourself as someone who experiences a lot of frustrations when driving?"	• Perception and attribution (general driving beliefs).

4.6.3. Procedure

Ethical clearance for this study was gained as part of the clearance requested for the driver diary study. As described earlier, information about participation in the interviews was disseminated during recruitment and consent to the diary study.

Interviews were conducted by phone from QUT's Kelvin Grove campus. Participants were advised by email that they had been randomly selected for an interview, and a time for the interview was provided based on the participant's specified availability. Participants were advised that the interview would take approximately 15 minutes, asked to ensure they had a quiet space to conduct the interview, and informed that a landline was preferable to a mobile phone. The researcher phoned the participant at the scheduled time, explained the interview process, and obtained consent for the interview to be recorded in order to allow for accurate transcription. Upon completion of the interview, recording was ceased, participants were provided with an opportunity to ask any questions, and they were thanked for their time.

4.6.4. Analysis

All interview recordings were transcribed by a professional transcription service. The analysis then adopted a similar procedure to that of the thematic analysis described in section 3.6.4.1 of the previous study. The analysis commenced with the author conducting two complete readings of the interview transcripts to become acquainted with the responses. Initial coding then commenced, which assisted in moving the data from fragments of individual speech into to more meaningful categories that elucidated commonalties in responses. However, because a goal of the second study was to gain information relating to the specified key constructs of the model, codes were reviewed and categorised based on how they could inform the key constructs of the model.

4.7. Findings and discussion

The findings are presented in accordance with the key constructs of the proposed model and are depicted as they relate to the model in Figure 4.1. As Figure 4.1 shows, four key themes with between two and four subthemes were identified at the key stages of the model.

First, reflecting the initial events component of the model, two overlapping, yet distinct themes were identified regarding potential beliefs and attitudes that may influence drivers' perceptions of on-road events. The first subtheme related to participants beliefs that most motorists' driving behaviour is poor, or lacking. Specifically, participants reported beliefs that other drivers do no obey the road rules, do not pay attention to driving and frequently display rude, discourteous behaviour. More importantly, though, the drivers who were interviewed also appeared to believe that poor driving was prevalent to the extent that they perceived poor, substandard driving as the "normal", expected standard of driving behaviour. The second subtheme reflecting the initial events component of the model extended on the concept of driver etiquette as is described in Chapter 3. It must be noted that while the concept of driver etiquette emerged in both of these subthemes, there were important distinctions regarding how comments were classified in each subtheme. Specifically, comments regarding driver etiquette were coded under the 'poor driving standards' subtheme when they appeared to describe poor etiquette as widespread – that is, comments regarding perceptions that most drivers are rude and discourteous. In contrast, comments were coded under the broader 'driving etiquette' subtheme when they appeared to discuss the concept of etiquette in a more general sense. Comments relating to this latter subtheme focused on further disentangling what constitutes driving etiquette and how one's perception that etiquette had been violated may be associated with anger and aggression.

Second, four subthemes relating to the information that drivers utilise in interpreting on-road events were identified at the perception and appraisal part of the model. First, stereotypes regarding certain vehicles or types of drivers that appear to influence perceptions of on-road events were identified, including comments from drivers who belong to the stereotyped groups (e.g., p-platers). Second, how frequently drivers experience certain provocative events in their everyday driving appeared to influence their perceptions of the motorist's intentions. Specifically, events that were experienced more regularly seemed to be regarded as aggressive. Third, some comments suggested that drivers who responded aggressively seemed to perceive that their driving abilities had been criticised by another driver. Finally, the last subtheme at this stage of the model consisted of comments from drivers who did not appear to respond aggressively to their reported provocation. Specifically, these comments

appear to suggest that drivers who did not respond aggressively made more favourable attributions, describing the offending driver's behaviour as a mistake or lapse in attention rather than a malicious, deliberate act.

At the behavioural response part of the model, two subthemes were identified: aggressive responses, which appeared to be designed to teach the offending driver a lesson and non-aggressive responses, where drivers described the reasons why they did not respond aggressively to provocations. Finally, two subthemes were identified pertaining to drivers thoughts and feelings after the event, the first being that drivers who responded aggressively did not appear to get any relief from their response, and, in fact, seemed to regret their behaviour. The second subtheme related to drivers who described an event that appeared to escalate after their aggressive response.

These themes will now be discussed and described further. Evidence supporting the researcher's interpretations is provided in the form of verbatim quotes from the transcripts. Gender and age of the interviewee are provided at the end of the quotation. Minor editing to remove small pauses in speech (e.g., 'uh', 'um', etc.) has been conducted to improve readability of these quotes, but has not altered or distorted the information being conveyed in them. Further, a small handful of these quotes contain expletives. Although it was considered important to maintain the integrity of these responses, where expletives were used, the middle letters of the word have been replaced with asterisks; however, the meaning of the word remains apparent. It should be noted that these examples have been selected because they are considered to best represent the theme or observation being described. They have not been included to cause offense.

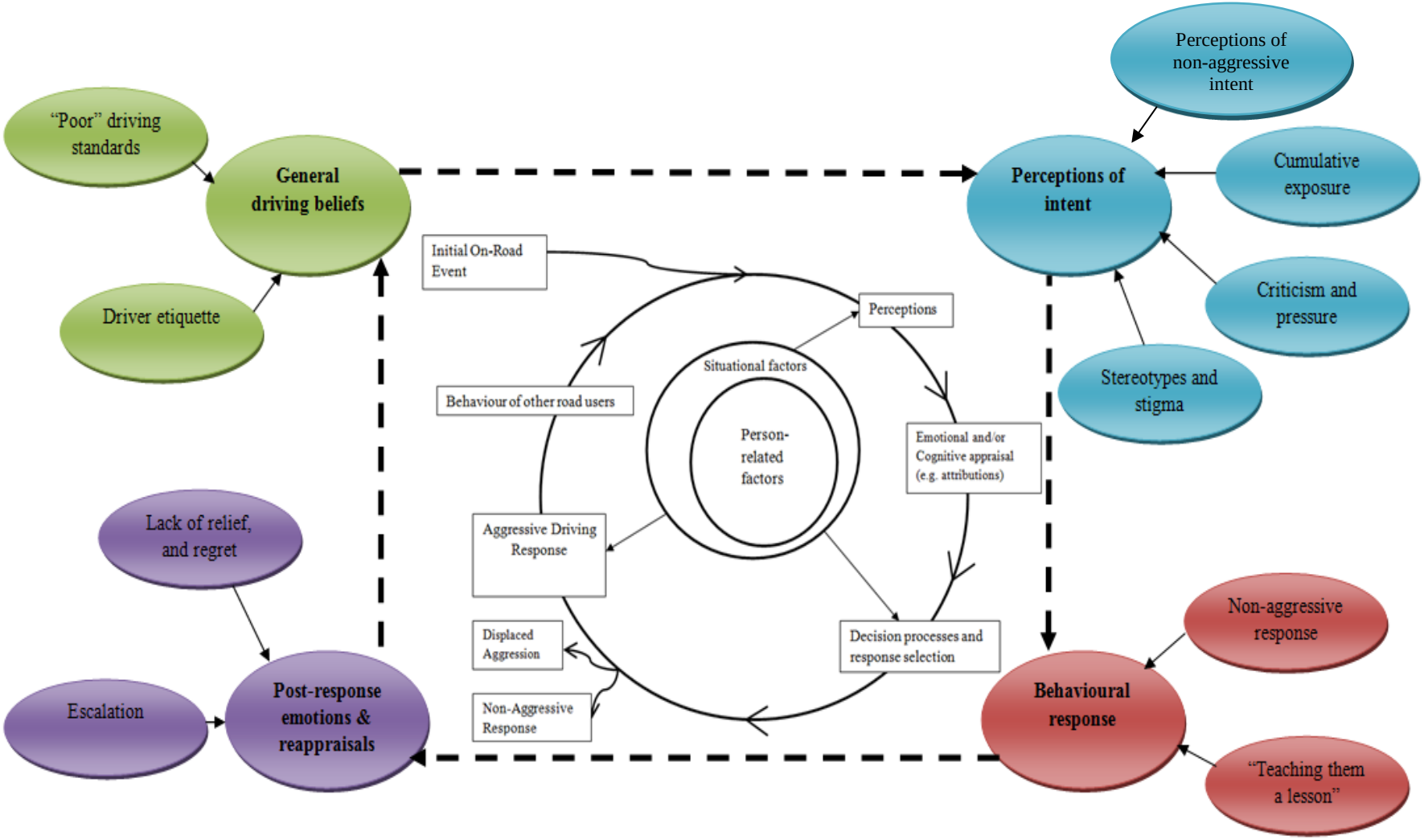

Figure 4.1.Interview themes as they relate to the proposed model.

4.7.1. General driving beliefs

Interviews aimed to identify and explore some of the broad, general beliefs drivers have that provide the lens through which they make sense of their driving environment, and which influence drivers' perceptions and appraisals of provocative events. Participants' thoughts regarding what they consider to be typical or common driving behaviour became apparent in a number of interviews, which in turn drew attention to some shared beliefs about driving standards that may influence subsequent driver aggression. The two most prominent of these emergent beliefs have been labelled "poor driving standards" and "driver etiquette".

4.7.1.1. "Poor" driving standards

Material classified under this theme included remarks where participants appeared to describe the general standards of driving behaviour of most other drivers as lacking or substandard in some way. For instance, some drivers discussed their perceptions that very few motorists appear to obey the legal road rules, whereas others described the behaviour of other drivers as complacent and careless. Alternatively, other participants described the general standards of other driver's behaviour as poor, because they were rude and discourteous.

Regardless of how these participants described their conceptualisations of behaviour they consider substandard, something their comments appeared to share was a belief, or assumption that substandard driving was widespread, and it was common to encounter it while driving. Accordingly, these drivers appeared to consider poor driving behaviour to be the expected, or standard level of driving behaviour. Thus the broad, general term of "poor" is used to succinctly encapsulate these conceptualisations of substandard driving, and the label "poor driving standards" given to reflect the implication of these collective comments, which suggest that drivers expect, or presume that they will encounter poor driving behaviour from other road users.

To illustrate this theme further, descriptions of poor driving from drivers described poor driving in terms of disregarding the road rules were evident in the following types of remarks:

"People don't seem to, to either care about, you know, the road rules" (Female, 35).

"I feel like every time I go driving you, it feels like these days nobody does the speed limit" (Female, 30).

In both of these comments, reference to widespread disregard of the road rules is evident, particularly in the remarks of the second driver (Female, 30), where she states that she encounters speeding motorists every time she drives. Further the use of the word "people" rather than a term like "some drivers" in the first quote suggests her comment applies to a large group of drivers, rather than a small minority. Alternatively, other drivers discussed their perceptions of a careless attitude that they feel many other drivers take to the road with. To elaborate, these drivers described themselves having a strong appreciation of the dangers associated with driving. However, a sense of disappointment could also be discerned in the comments made by these drivers, which appeared to stem from their belief that other drivers do not take driving seriously, as succinctly shown by the following remark:

"I find it so frustrating that people don't understand what a big deal it is" (Female, 21).

Some of these drivers commenting on the lack of regard given to driving spoke about it in terms of complacency, explaining that they believe that for many motorists, driving has become such a highly automated task that they neglect to give it adequate attention. For example:

"It's something that once you get in a car you should be paying, you know, my three main things are observation, concentration and anticipation. Too many people are too busy having themselves a drink or fiddling around with something in the car, you know, it's just, I don't know, people are distracted or they think there's nothing to driving. Needs to be taken more, you know, people need to take driving more seriously" (Male, 52a).

(Discussing a woman who was texting while driving on a major Motorway) "Most people, her included, don't give any thoughts to the actual driving and it's more because she's probably been driving, cause she was a middle aged

woman, she's probably been driving a long time and thinking she can do anything she likes. So, texting is more important than driving because driving, you know, is more of a natural thing now. So she's had to pay more attention to her texting" (Male, 52b).

These comments are arguably similar to comments from drivers discussing their perceptions of widespread disregard of the rules: the use of phrase such as "too many people" and "most people" in the remarks from these drivers indicates that they consider negligent driving to be prevalent, and something that many drivers do. Interestingly, some drivers who discussed these widespread poor standards of driving behaviour also expressed an attitude akin to the popular phrase "if you can't beat them, join them", implying that they too, engage in bad driving behaviour:

(Describing his own tailgating of another driver)"Well you see everybody travels that closely. I don't know whether a person's tailgating or not because it's, they just travel far too closely and that's just the way it goes and if you don't someone will pull into the gap anyway so you're following them closely"(Male, 63).

Several elements of this example are of interest. Firstly, consistent with the earlier remarks provided, his comments that "everybody travels that closely" and "that's just the way it goes" imply that failure to keep adequate braking distance appears to be a common experience for him. Further, his comments also allude to cutting off or pushing in behaviours as normal or widespread. Most interestingly though, his comment suggests that he considers poor driving to be inevitable, implying that he experiences cutting off or pushing in behaviours when allowing safe travelling distance: thus it appears that he believes, or is perhaps resigned to the fact that engaging in one dangerous behaviour (tailgating) prevents another one from happening. Alternatively, he may believe that his own poor driving (i.e., tailgating) is justified, because he believes everyone else drives poorly, too.

Additionally, other drivers described widespread poor driving using expressions that, arguably, share many similarities with remarks contained in the driving etiquette theme described in the previous chapter. To illustrate, consider the following comments:

*"I just feel very disillusioned with peoples manners, you know I just think, it makes me angry and it makes me get a bit angry at society because you think 'why can't people just be nice, why do you have to be an a***hole'?"(Female, 39a).*

"But it's when people are rude and put you in danger and when you're left with that feeling of, you know, you're frightened and you've been made to feel really nervous and suddenly you feel a little bit nauseous, you know, that makes you angry, you think that's not right because I don't do that to other drivers and, you know, you don't expect that in return"(Female, 39b).

Similarities between these comments and those comments provided in section 3.11.1 of the previous chapter can be identified: the use of the term "rude" to describe other motorists driving behaviour, reference to a lack of appropriate manners and an expectation that drivers should be polite and treat others the way they would like to be treated. However, these comments add an additional layer of complexity to the remarks observed in the diaries: they suggest that for these drivers, poor etiquette is a common experience. This is evident in the use of terms such as "disillusioned" and "nervous" to describe how they feel about driving: these terms imply that they consider poor driver etiquette to be common enough that they feel let down by their fellow motorists' manners.

The combination of complacent driving, disregard for the rules, coupled with feeling as though one has to be alert to rude or discourteous drivers seemed to lead some interviewed drivers to view driving as unpleasant and stressful:

"Congestion is a stressful environment anyway and then when people are discourteous like that it just makes it worse" (Female, 20).

"It's so hard to be on the road when people are, you know, you're so busy trying to concentrate on everything and you actually have to concentrate on people that are doing the wrong thing on top of it as well"(Female, 39).

"I try and be aware of other people and I feel like other drivers aren't aware of me when they're on the road. They just are sort of aware of themselves and I find that really frustrating. The behaviour that you try and. practise that's not given to you. It feels like there's like a lack of consideration. Whereas,

like, if you try and obey the road rules and stop when you're meant to stop and give way when you're meant to give way, and it feels like other people don't do that. They just go and it doesn't, they don't really care how it impacts other drivers" (Female, 30).

These quotes describe the general road environment as frustrating or stressful, which raises questions concerning the effect of stress on driving behaviour. As section 4.8.1 will describe, stress has been found to impair driving performance. As such, if some motorists find driving stressful based on their belief that poor driving is common, then a general belief that the standards of other motorists driving behaviour is lacking may arguably have wider and potentially serious implications: it could be deteriorating driver's performance by diverting their attention towards being alert towards instances of poor driving.

When the above comments are taken collectively, they suggest that drivers may take to the road with the expectation that they will encounter drivers who behave poorly by disobeying the road rules, behave carelessly, or display poor etiquette, which may have implications for subsequent aggression when this expectation is met. Interestingly, despite the apparent belief that drivers should show courtesy towards their fellow motorists, many drivers also appear to believe that this expectation will not be met. That is, poor driving etiquette also appeared to be perceived as "normal", though unacceptable.

4.7.1.2. Driving etiquette

Mirroring comments observed in the diaries, the notion of driver etiquette was evident in remarks made by participants throughout the interviews. However, interview comments were able to supplement the understanding of driver etiquette, and its apparent relationship with driver aggression. Firstly, similar sentiments to those observed in diary responses were evident in the following types of comments:

"This person shouldn't be in and out of traffic and expect everyone to sort of give way to him" (Female, 33).

*"What a selfish a***hole" (Female, 20).*

"What makes you think that you getting to your destination is more important than me getting to my destination? Why does she think, why is it okay for me to wait in line and be patient but, you know, she has to go to the head of the queue?"(Female, 53).

These comments are similar to those that were categorised in the driving etiquette theme in the previous chapter: they convey negative emotions stemming from perceptions that another driver is being inattentive and inconsiderate, putting his or her own needs above others. However, interview participants were able to elucidate some of behaviours that constitute good driver etiquette. For example, consider the following:

(Discussing what constitutes good versus bad driving) "You know not putting other drivers in danger because of your actions and just having some good manners and some courtesy on the road. When people shove themselves into situations where you know they know full well that it's going to upset that [other] driver or possibly lead to a problem" (Female, 39).

"You expect them to observe around them, and know what's going on, and know that if they do something it will make it easier for the rest of the people"(Female, 35).

These examples demonstrate two important facets of what these drivers consider to be proper driver etiquette. The first driver describes showing respect and consideration for fellow motorists by not putting them in danger as hallmarks of appropriate driving etiquette, while the second comment adds awareness of other drivers and not causing unnecessary inconvenience to others as elements of good driving. Likewise, other comments discussed appropriate driving behaviour in terms of courtesy: polite behaviour that goes above and beyond the legal road rules:

"If you are waiting for the car park, then they look for somewhere else, you know. Like your indicator is up. It's courtesy, you know. It's not really a rule, but yes [it's an expectation]"(Female, 37).

"Wherever I drive, if I'm coming up to a set of lights, and a car behind me wants to turn left, and they don't have to stop at the lights, I move forward as far as I can to give them enough room if I can"(Female, 35).

These comments provide specific examples of what these motorists consider to be appropriate driving behaviour, which are consistent with the notion of good driver etiquette: they discuss showing awareness and consideration to fellow motorists. However, the second driver quoted above went on to acknowledge later in the discussion that awareness is a big part of behaving courteously; one must recognise the opportunity to display courtesy for it to happen:

"I mean it seems to me it's a courtesy, but you have to be aware of it first, I guess"(Female, 35).

This comment highlights that some instances of discourteous behaviour may be lapses in attention, which emphasises the importance of appraisals in the driving environment: an innocent lapse in attention by one driver could be interpreted as deliberately discourteous rather than a mistake, and responded to with aggression. Moreover, when considered alongside comments provided in the preceding chapter that described slow driving as discourteous (because it is inattentive), it appears that being unaware of the opportunity to display courteous behaviour might be perceived as an etiquette violation in and of itself.

Additionally, several comments from other drivers also appear to suggest that disregarding conventions for appropriate driving etiquette triggers anger and aggression. For instance, one driver who responded aggressively to having her progress impeded by a driver who she believed had deliberately held her up at a set of traffic lights gave the following reason for regarding this as negative and responding aggressively:

"The nature of how I was being held up. Like, if it was just a red light I'd be like 'okay, whatever' or if it was really heavy traffic, fair enough. But, just the fact that it could have been avoided if he had been slightly more considerate of everyone else" (Female, 18).

Thus her perception that the delay was caused by the inconsiderate actions of the other driver appears to be the most negative aspect of the event, rather than the delay itself. Furthermore, other interview participants who offered their thoughts regarding the on-road experiences they consider negative, described inconsiderate, impolite behaviour from other motorists:

> *(Describing what makes her angry when driving) "People that don't seem to, to either care about the road rules or, or that sort of thing, or care about the impact that they have on the other drivers or people in general. Politeness and stuff to other people, you know, the hand gestures or the yelling or the, the raised eyebrows and rolling eyes and that sort of stuff, that's not pleasant"(Female, 35).*

> *"You start off with a nice day and then something on the face of it, is trivial, but it could have been quite dangerous and well, this person didn't care at all how they affected my day type of thing"(Male, 61).*

Finally, some participants' remarks highlighted that what is considered appropriate etiquette may be culturally specific. To elucidate, when describing experiences of driving while living in overseas, the following observations were provided:

> *"They [Thailand drivers] beep all the time, but it's a courtesy thing, it's a 'I'm here, be careful'. Here in Australia we don't do that. We beep and people go, they instantly, generally, will stick their finger up at you, because you've beeped at them, and they don't realise that you're doing that out of courtesy and not out of aggression"(Female, 35).*

> *"I spent a year in Italy, and they're very expressive with the way they drive with their horns over there. Here that could be considered road rage. There, it's normal. There's, like, this little part of my brain, like the little Italian comes out, and I want to express myself in the same way, but I don't, because here that's classed as road rage, and it would be quite rude"(Female, 20).*

This comment implies that as part of the Queensland driving culture, horn honking is regarded more as a criticism than a warning or positive form of

communication. This may have implications for a growing multicultural society like Australia, which will be explored in the discussion (section 4.8).

4.7.2. Perception of provocative events

Information pertaining to the factors that may influence drivers' perceptions of provocative on-road events, particularly their perceptions of malicious or aggressive intentions from other drivers were evident in several comments made throughout the interviews.

4.7.2.1. Perception of the driver: Stigma and stereotypes

Comments suggested that for some drivers, their perceptions and appraisals of events appear to be based on impressions or inferences they draw from the physical appearance of the driver as well as the vehicle involved. Moreover, this impression appeared to provide the basis for shaping drivers' perceptions of the other driver's behaviour as aggressive. To illustrate, consider the following remarks offered by participants when explaining why they believe the behaviour of the offending driver was intentional:

> *"He just looked like the type of person that, that does that. Some people are just aggressive" (Female, 35).*

> *"He doesn't look like, you know, a good sophisticated guy you know" (Female, 37).*

> *"He just looked like a troublemaker" (Female, 30).*

While these comments are quite vague and do not offer any explicit information about what characteristics of the driver gave these impressions, they do demonstrate that the negative perception was formed on the basis of looks or a "vibe" they perceived from the driver. Other remarks, however, indicated what characteristics influenced perceptions of aggressive versus non-aggressive intent:

> *"I react differently depending on who the driver is. Younger drivers, I'm more than happy to let them know they're doing the wrong thing, but when they get old, I don't know what it is. I think it's just because they are just so old and fragile that I just don't want to go there" (Female, 21).*

*"Like if it was a, a little lady doing the gesture or maybe someone else, it probably wouldn't have affected me the way it did, but because he just, he looked a bit aggressive and he looked like a bit of a w**k that it affected me that way"(Female, 35).*

These comments clearly state that the participants' perceptions of the event and responses to it, were influenced by their perceptions about who the driver was, suggesting that these perceptions may play a role in driver aggression. Echoing findings described in the previous chapter, older drivers appear to be protected against aggression: in the first quotation (Female, 21) asserts that she would be unlikely to have responded aggressively in the same situation had it involved an older driver, based on her belief that older adults are more vulnerable. In addition, the second quotation (Female, 35) indicates that the gender of the offending driver may play a role in perceiving aggressive intent: she states that she is unlikely to have been negatively affected by the gesture if the offending driver had been female. Thus it is possible that for some drivers, the behaviour of male drivers may arouse more anger and subsequent aggression than that of females.

Similarly, other comments indicated that drivers' perceptions of the event were made based on the vehicle involved, and assumptions regarding the types of people who drive particular types of vehicles. The role of vehicle type also surfaced in the diaries; however, different types of vehicles to those mentioned in the diaries were discussed in the interviews. Specifically, trucks and utility vehicles (colloquially referred to as "utes") were identified:

(Talking about a utility driver) "You know this would not have been the first time, he's done this, he's probably one of these very careless reckless drivers that takes risks like he did, going up on the inside of me, pushing the boundaries of you know 'I've got this big car and I can make you get off the road' sort of thing"(Female, 62).

"He was in the ute. He had the singlet on" (Female, 21).

"This guy's obviously driving a big truck, because he's got issues elsewhere in his life, and if he really thinks that he's going to abuse me for something that he did wrong, good luck"(Female, 38).

Assumptions about underlying characteristics of the drivers of these vehicles are apparent in these quotations. In first quotation, the participant (Female, 62) appears to base her statements that the offending driver has done the same behaviour before on the fact that he drives a utility vehicle that is larger than others, whereas the second quotation (Female 21) is quite subtle. Her comment does not explicitly state what assumptions she made about the utility driver, but it implies that she holds some belief or assumption about men who drive utes and wear singlets. Furthermore, the third quotation (Female, 38) states that the man is driving a truck, because he has issues in other aspects of his life, which implies that she believes that certain people, presumably people with problems elsewhere in life, tend to drive trucks. Thus although these quotations discuss different vehicle types to those in Study 1, they support the interpretation that drivers make inferences about other motorists based on their appearance and the vehicles they drive. Furthermore, in light of the earlier comment which suggested that the gender of the driver may influence perceptions of aggressive intent, it is interesting to note that all three of the above remarks were about the behaviour of a male driver and were offered by female participants.

Some comments made by participants who reported being on the receiving end of an aggressive behaviour suggested that they may have internalised negative stereotypes about some of the driver groups to which they belong; that is to say, these drivers appeared to attribute the aggressive or negative behaviour they received to inherent characteristics of themselves such as their age or gender:

"Maybe he saw me and being a woman, it might have been easy target for him" (Female, 37).

"It could have been a male-female driver thing. Some men seem to think that, you know, women shouldn't be on the road and he's probably thinking 'oh you silly woman waiting there for that park' and that's the thing" (Female, 35).

"Probably because of my gender" (Female, 62).

These remarks imply that female drivers may appraise some provocations as aggressive attacks based on their gender and negative assumptions regarding female drivers. Moreover, comments made by p-platers who were interviewed offered similar to remarks to those provided in the preceding chapter, where they described their perceptions that negative behaviour directed towards them was based on their status as a provisional licence holder, due to the negative connotations other drivers seem to hold about p-platers:

> *"You know, when it comes to like people cutting you off or abruptly stopping in front of you or, you know, doing stupid stuff, which I see more than I should. People do stupid things around me, I guess, because I'm a p plater. But I don't know, I'm a forward thinker and I kind of go, you know, 'if I hadn't braked in time, you could have seriously injured the people around you' and that really irritates me particularly, you know, I have brothers that I drive from place to place, and that really makes me angry, because someone else has put not only my life but my brothers lives in danger"(Female, 20).*

> *"I thought maybe because he saw that I was a younger driver in a p plater car, was, you know, trying to be annoying." (Female, 21)*

Considered together, these comments from female drivers and younger drivers reflect elements of the concept of stigma, and will be addressed further in the discussion (see section 4.8.1).

4.7.2.2. Priming: Cumulative exposure and anticipation

Similar to results described in the previous study, some comments suggest that priming may be involved in the perception and appraisal of events that may be responded to with aggression. This manifested in two related but distinct types of primes: perceiving the event as negative because it was a regular occurrence, and anticipating that the particular event in question would happen based on the offending driver's earlier behaviour. The subtle differences between these two will now be described.

Consistent with diary responses, comments made throughout interviews suggested that the cumulative effects of repeated exposure to the same types of event may influence aggression by priming drivers to expect it. Interview discussions

provided elaboration on these comments and greater depth to understanding them. To illustrate, consider the following comment from a driver describing her afternoon commute home from work:

> *"When I pull up to this intersection every day, it's like I'm kind of apprehensive but expecting it to be kind of bad. Like every day feels like a fluke till I get through it, so I'm kind of, like, aware. I have to be aggressive in my driving or I can't get through, because of that reason I know I get angry" (Female, 28).*

Several points in this comment must be highlighted: firstly, she describes this intersection as one she travels through daily and expects it to be difficult. However, of particular interest, her comment also implies that the reason she experiences anger is because she believes that she must display aggression if she wishes to get through the intersection. That is, she appears to consider her aggression to be justified, or necessary and describes her anger as subsequent to her aggression rather than as a precursor to it. When probed about why she feels angry about regular events she knows will happen, she offered the following explanation:

> *"It's more long like ongoing…this is more over a longer period of time"(Female, 28).*

Thus based on her comments, it appears that the enduring nature of the event and the cumulative effect of encountering it every day is a source of anger or frustration for her, and the anger that triggers her aggression may be primed by her expectation that she will experience a situation where she believes she will need to be aggressive. Likewise, comments from other participants described regularly encountering specific types of poor driving on particular stretches of road, so much so, that they have come to expect it when travelling on them:

> *"I kind of always expect it [pushing-in behaviours], because everyone seems to be in a big rush and hurry, and they all, all get in the, in the right hand lane, but they all know that it ends. You can only turn right onto Logan Road, and they want to go left. Yeah so they all, they all have to move over" (Female, 55a).*

"Every time I get into that lane and think that I'm going to have a nice, you know, that I can just carry on, and I get stuck behind somebody who's doing ten k's less than the speed limit" (Female, 55b).

These comments present some similarities to those presented in the poor driving standard theme discussed earlier: they suggest that the behaviour(s) in question are widespread and expected, though not acceptable. However, one interviewed driver commented that expecting the behaviour to happen decreased her anger and anxiety:

"I was expecting it, so I was, I was just sort of pretty calm, and let them come in, because it's like, you know, we've all got to share the road, and there's no point in getting stressed about it. I was thinking the crazy, 'here we go again'... I was being quite nice actually, I thought" (Female, 55a).

In contrast to the above comments, where drivers described the cumulative influence of regularly encountering the same event, the collection of comments labelled "anticipation" emerged from responses where participants were recalling the behaviour of the offending driver immediately prior to the negative event. In particular, these participants recalled cues they perceived in the offending driver's behaviour that led them to anticipate that the event would happen. To illustrate, consider the following comments from a driver who discussed being held up by several traffic light changes while attempting to make her required turn during her morning commute to work. When she approached the front of the queue, she recalled noticing a vehicle in the lane next to her, a lane dedicated to travelling straight ahead rather than turning. This participant described expecting that the driver in the lane travelling straight would actually turn when the traffic signal changed:

(Discussing another driver who cut in front of her from the wrong lane) "I could just tell by her, the body language of the car if there is such a thing. That she didn't have her indicator on to turn right, but when the lights turned green that's what she did, essentially cutting me off" (Female, 53).

When prompted to elaborate on what "body language" she believed the vehicle displayed that led her to anticipate the driver's actions, she mentioned the following aspects:

"They were creeping forward slowly trying to anticipate the light change. She didn't want to make eye contact with anyone, because she knew what she was going to do" (Female, 53).

This participant described responded by honking the horn at the driver when her suspicions were confirmed. Thus it appears that this driver justified her aggressive response based on her anticipation that the offending driver would behave selfishly. Moreover, this suggests that there may be certain behaviours that cue, or prime aggressive scripts, before certain provocative events actually occur.

Further evidence that anticipating another driver's behaviour may influence aggression was apparent in comments from a participant who reported approaching the driver she believed took a parking space she had been waiting for. She initially described giving him the benefit of the doubt, believing that he may have been a construction worker at a large nearby development and thus may have needed the space for work purposes. However, similar to the above driver, she also described his lack of eye contact as he was parking as an indication that it could have been deliberate. When she approached him to ask if he realised she was waiting first, she describes his response as follows:

"There's no way that he, he wouldn't know that I was waiting there, because when I confronted him, he tried to avoid eye contact and he was like, 'just back off, just back off', like that. Like, he was moving his hands to try to tell me, 'just back off, just back off'. I was still thinking that, at the back of my mind…I was still thinking that there might be a possibility the guy is one of the workers that need a space. But when he didn't answer, and he was like trying to avoid eye contact, I knew for sure that this is like a dodgy one, so it's just like a random guy trying to find space"(Female, 37).

Thus, when remarks concerning the effects of repeated exposure to an event and anticipation are considered in conjunction with one another, they suggest that priming has important implications for driver aggression. Specifically, drivers may feel more justified in responding with aggression to events that they expected would occur, perhaps even considering their own aggressive behaviour as necessary.

4.7.2.3. Criticism and pressure

Some remarks made throughout the interviews suggested that some drivers perceived the negative events they experienced as deliberate attempts by the offending driver to criticise their driving, including these two examples:

> *(Describing a driver who tailgated her in heavy traffic, overtook and then abruptly cut in front of her) "It was testing me, it was like just judging, you know, she just moved up one car, and it was like 'was that really worth it'?"(Female, 30).*

> *"The first thing that was going through my mind, is 'well who do you think you are' you know, doing that gesture, it's like, 'well I'm, I'm in the right here'. I mean who cares. It's not like I'm blocking your way, it's not like I'm interrupting your day at all, you know, it's just I'm waiting there quietly for my park. You can just drive past, and there's no, absolutely no need to do that"(Female, 35).*

Both these comments describe the behaviour of the other driver as unnecessary and suggest that these participants took the other driver's behaviour personally; that is, they interpreted it as intended to send some sort of message to them about their driving: the first participant (Female, 30) explicitly states that the driver was testing and judging her, and in the second participant (Female, 35) appears to defend her behaviour, which implies that she considers the offending driver's behaviour to be communicating disapproval of her actions. Furthermore, some shared elements with the earlier theme of poor driving standards were apparent in participants' responses, with some drivers describing themselves as feeling coerced into risky or poor driving. For instance, consider the following remarks from a driver who described feeling victimised because she obeys the speed limit:

> *"I hate feeling pressured to do the wrong thing in case, 'cause I feel like if I did speed up, I, ultimately I would be the one that would get pulled over. It's always the way, whenever, you do something like that you're always the one that's caught out, so I always try and do the right thing, and obey the speed limits, and at the same time try and stay calm, and not let it make me anxious, or you always kind of feel like a bit of a victim, 'cause it feels like somebody is always tailgating you" (Female, 30).*

Thus her comment implies that she feels criticised for doing the right thing by obeying the speed limit. Interestingly, comments made by another driver suggest that a perception that aggression is a criticism, intended to pressure or prompt motorists to change their driving might be accurate. Specifically, the following comments were provided by a participant describing the purpose of her own tailgating of a slow driver as follows:

> *"I sped up in order to try and get her to move along a little bit. Usually when people notice tailgaters, they'll start speeding up. The other, I hate to admit it, the other intention was to purely annoy her" (Female, 24).*

Moreover, this same driver also stated that she believed that the slow driver may have had aggressive intentions and that the other's slow driving may have initially been a response to her behaviour:

> *"Well I suppose when she was going 40 (kph) I was going, like it wasn't to the point of tailgating, but I wasn't giving her the three lengths that you're meant to give. If I was going that slow, then I would have been going 20, 30 (kph) myself. So she might have thought that I was intentionally being annoying, so she might have slowed down more on purpose" (Female, 24).*

Thus something of a paradox is evident: based on her perception that she was being deliberately inconvenienced and annoyed, she tried correct the other driver's behaviour by doing the same in return. When these comments are considered collectively, they appear to echo comments already discussed regarding poor driving standards. That is, some drivers reported feeling criticised for driving appropriately and feeling pressure to conform to others' behaviour by disregarding the road rules. However, there was evidence that these interpretations of the intentions behind provocative events could be correct. This apparent intention to criticise and modify other drivers' behaviour will be explored further in section 4.7.3.1 where the teaching them a lesson theme from the previous study is explored in greater depth.

4.7.2.4. Perception of non-aggressive intent

Finally, although only appearing in a small portion of the interviews, some drivers' accounts shed light on the cognitions and feelings that were associated with non-aggressive responses to provocative events. Firstly, although these drivers appeared to perceive the event as provocative, it also appears that they searched for

alternative explanations that may explain the behaviour, other than aggressive or malicious intent, for example:

> *(Describing being honked at by another motorist) "I didn't really see anything to be angry about. They [the other driver] were obviously going through something that made them act that way. I didn't know what it was so I couldn't judge whether it was a valid reason or not. They were going to pass me in a few seconds so I wasn't really going to make a big deal out of it" (Female, 23).*

Other drivers appeared to display empathy, understanding that it is human nature to make mistakes, and thus attributed the event to a lapse in judgement or simple error:

> *"Sometimes I find myself doing it [tailgating] and I think, 'Oh I'm way too close, I've got to back off', and then I do back off, so I can understand how it happens, you know, without you realising it" (Female, 47).*

Finally, other comments conveyed a more optimistic outlook on society, and a belief that most people would not intentionally seek to harm others, or themselves, as shown by the following:

> *(Describing being cut off) "I think he probably just didn't see me. Either I was in his blind spot or I didn't or he didn't look. I can't think of any other reason for it happening really. Because it would have put him in as much risk as it put me" (Female, 47).*

These sentiments appear to contrast to those expressed by participants in the poor driving standards theme, where a negative and somewhat cynical or unforgiving opinion of the driving environment could be discerned. These comments may suggest that motorists who interpret other drivers' behaviour as a mistake or lapse in judgement may not believe that the standards of driving behaviour are poor and thus do not anticipate or expect it from others. Of particular interest, it must be noted that many events reported by drivers who did not respond aggressively were the same as events reported by drivers who did respond aggressively (e.g., cutting off, tailgating). Thus it appears that drivers who did not respond aggressively made different attributions regarding the underlying intentions of same behaviours that other drivers responded

aggressively to, highlighting the importance of the interpretations drivers. Although differences in attribution are a plausible explanation of these comments, as described in section 1.7, it must also be recognised that consistent with the GAM, attributions are influenced by stable trait personality characteristics (Wilkowski & Robinson, 2008), which will be examined in Chapter 5.

4.7.3. Behavioural responses

Fundamentally, drivers are faced with two choices when deciding how to handle the negative events they experience in their driving environments: they can respond to it, potentially with aggression; or they can ignore it, despite experiencing it as negative. Comments identified throughout the interviews that pertained to motivations for these two basic outcomes will be detailed below.

4.7.3.1. Aggressive Responses: Teaching them a lesson

The interviews offered an opportunity for more in-depth discussions with drivers about the purpose of responses that appeared to reflect aggressive intentions. Many of these comments offered some rich insights into the teaching them a lesson theme described in the preceding chapter. Firstly, behavioural responses designed to convey criticism and disapproval described in the interviews expressed similar sentiments to those expressed in the previous study, as illustrated by these examples:

> *"I think why I did it [honk the horn] with him was because I thought that he didn't know that he was doing the wrong thing" (Female, 21).*

> *"(Honking the horn) I was hoping to bring to her attention that she's done the wrong thing. And it's not right"(Female, 53).*

Furthermore, other comments made by drivers suggested that the purpose of their responses was to criticise and insult, sending the offending driver a message that their behaviour was not appropriate; examples include:

> *(Honking at a driver who blocked the intersection, preventing her from travelling through) "So it was more like, I knew he couldn't do anything, but I wanted him to know that he'd inconvenienced me. I felt like a little bit satisfied, because I'd gotten through to him, like he noticed what he'd done"(Female, 28).*

(Honking at a driver who he described as speeding up to prevent him from merging) "The intended effect is to let people know that they're being stupid" (Male, 52).

The inference drawn from these quotes is that their response was a way to express their displeasure or disapproval of the other driver's behaviour. The first quote (Female, 28) explicitly describes a sense of satisfaction from letting the driver know that he inconvenienced her, whereas the second comment is more candid: the use of the word "stupid" to describe the behaviour of other drivers suggests that the purpose of his response is to insult the driver. Moreover, this second quote provides a clear example of how responses designed to criticise can be regarded as aggressive: by insulting the target driver, it is likely that he intended to have a negative impact on the driver, thus causing them psychological harm. In addition, a desire to change or modify the offending driver's behaviour with the aggressive response was evident in diary comments, as shown by the following:

"You shouldn't do that, it's rude, like you know. Just to make them aware that should the situation repeat themselves" (Female, 20).

"I would want him to, to feel a bit bad and maybe think twice about doing that sort of thing again, and maybe he, he might think that maybe he's not always right"(Female, 35)

"I guess it would nice to think that next time they would think twice, and if they found themselves in a hurry and creeping up on the person in front of them, that they might stop and slow down and maybe … ultimately it would be nice to know that, nice to think that you would be able to affect their future actions"(Female, 30).

"I just sort of wanted to make a point that you can't do that and , like, I don't know, it might not have even crossed his mind that I thought that wasn't the right thing to do. Then if I did that, and he by some miracle realised that that's not a very considerate thing to do and people don't like it, that maybe he wouldn't do it in the future and hold somebody else up" (Female, 18).

These comments share the use of phrases such as "should the situation repeat itself" and "future actions", which implies that the purpose of these drivers' responses was to discourage the other driver from repeating the behaviour. Interestingly, the remark by the third driver (Female, 18) that the target driver might "by some miracle" recognise his behaviour was impolite, suggests that she recognises that her response is unlikely to have any effect on him. Nevertheless, she engaged in the aggressive response regardless, which raises questions concerning why drivers use behaviours they believe will be unlikely to have an impact.

Moreover, some drivers' appeared to be motivated by revenge: their response was designed to give the target driver a taste of their own medicine. To do this, these drivers either mirrored the offensive behaviour back or exhibited an equally aggressive behaviour in return, arguably to show the other driver how it feels to be on the receiving end:

> *(Tailgating a driver) "I'm going to do it to you to see how you feel about it. Drive up her, yeah drive up and make her see how it feels, or make it hard for her to go fast" (Female, 30).*

> *(Describing her response to a man who gave her a 'what are you doing' gesture while she waited for a carpark) "Mirrored it back to him so it made him realise what a tool he looked like" (Female, 35).*

A further element of the teaching them a lesson theme that emerged through interview discussions came from a participant who described aggressive intentions for their behaviour that although neither overtly nor traditionally aggressive, was risky. Specifically, this participant was recounting a situation when he was attempting to merge lanes in peak-hour traffic and where he perceived a driver had sped up to close the gap. He responded by continuing to merge, despite there now being another vehicle in his way. This participant recalled that the offending driver had to swerve into oncoming traffic and narrowly missed being involved in a head-on collision with an oncoming vehicle. He described feeling pleased with his actions:

> *"I was amused because of where he ended up as a result of his own actions. It became more dangerous to him after doing what he did. So he suffered*

more for his actions than I did. So I figured it was quite amusing that you know he ended up, could have had a head-on collision" (Male, 52).

Although this participant's actions were arguably dangerous and are likely to have increased the potential for him to be involved in a collision had the offending driver not swerved, he stated that he was amused by his response. Thus, an inference drawn from this comment is that the participant hoped that by placing the offending driver in a dangerous situation that almost involved a collision that they would experience negative consequences of their actions thereby presumably teaching the target driver to drive with more care in the future. Alternatively, this participant's comments could also reflect a belief in a 'just world' such that bad things happen to bad people (Lerner, 1965). The sense of satisfaction he reported in regards to his behaviour could stem from his perception that the ostensibly 'bad' driver got what they deserved by almost being in a collision.

An additional facet of the teaching them a lesson theme that emerged through the interviews were comments that suggested a competitive or perhaps defiant element to aggressive responses. Specifically, the accounts some drivers gave of their own aggressive behaviour suggested they consider their own aggressive behaviour as a way of standing up for themselves and defending their rights on the road, for example:

(Describing why she sped up to prevent a motorist from merging that she believed had intentionally been in the wrong lane to get further ahead)"I'm not giving you, I'm not letting you come in. It's just, you just don't feel that it's right for people to walk all over you" (Female, 33).

Thus in this instance, the lesson may be twofold: firstly, to communicate that the behaviour is unacceptable, and secondly, to convey that being treated discourteously will not be tolerated. In this sense, overlap between the teaching them a lesson theme and poor driving standards theme is evident. That is, some drivers may consider their aggressive behaviour to be justified as a way of protesting against poor driving behaviour.

4.7.3.2. Non-aggressive responses

The interviews were able to provide some insights into the various reasons why some drivers chose not to respond to a negative event, despite their reports of feeling

angered or frustrated by it. Firstly, some participants stated that the reason they did not retaliate was to avoid creating a scene, as shown by the following:

> *"I didn't want to draw attention to myself, because there were so many cars on the road at the same time" (Female, 30).*

> *"There's so many cars around, it could distract them. I need to focus on the road and it's just not worth it so" (Female, 30).*

Furthermore, some of these drivers appeared to be aware of the ambiguity of on-road communication, citing it as a factor that influenced their response, for instance:

> *"I know the feeling when someone near me honks a horn and I go, 'oh my gosh, what have I done wrong?' and I'm one of those people who was like 'all right let me slow down, let me check that I'm okay'. So I didn't want to put other people through that who weren't being affected. If they're driving in the left lane they weren't being affected at all so I didn't want to bring them into it"(Female, 21).*

Other drivers cited their fear of potential consequences that may occur as a result of their aggression as the reason they refrained from responding. For some, these consequences included being involved in a crash and receiving damage to their vehicle, for example:

> *"She's in a huge car. I'm in a little car, and I don't think I'm a good enough driver to be tailgating so I decided not to, again because I was like 'well if something happened, I'd be really annoyed at myself', because there's no point in potentially taking that risk…I'm a bit precious about my car" (Female, 30).*

However, most of the interview participants appeared to be most concerned about aggressive retaliation from the target driver:

> *"You hear so many incidents about people reacting during road rage incidents that I felt like you just never know what the other person might do. They could, you know, [pause] attack" (Female, 30).*

"Well if, you know, for example, he happened to be someone with a quick temper, you're in stand-still traffic. If he's for some, whatever reason took offence to that, and then got out of his car, and then came to, I don't know, verbally abuse me or cause a scene, there was nowhere I could go"(Female, 20).

These comments imply that drivers are aware of violent road incidents and may be afraid of them. In this way, perhaps media reports of road violence may protect against further violence. Although such reports can lead to false impressions regarding the prevalence of road violence, perceptions that road violence is prevalent may in fact deter some drivers from engaging in non-violent aggressive responses for fear of the potential for escalation into road violence. This may in turn prevent an event that might have resulted in violence. Finally, other drivers seemed to abstain from responding, because they believed their efforts would be ineffective:

"It's just pointless really because that just seems to make the whole situation escalate"(Female, 62).

"What's the point? You're only going to, you know, you're not going to prove anything by it" (Male, 65).

"Because it [sic] didn't achieve anything. It's pointless" (Male, 61).

"Wasn't really anything much else to do other than just wait for somebody else to let me in, because I mean anything else wouldn't have been helpful to me at all. It just made me feel like I had manners, if that makes sense?"(Female, 20).

While the first comment (Female, 62) suggests that the participant refrained from aggression because it would not achieve anything, the second comment (Female, 20) resembles those described in the superiority theme in the previous study. In this theme, drivers appeared to gain a sense of satisfaction by refraining from an aggressive response, consistent with the concept of the moral self. Likewise, this driver states that not responding made her feel like the more courteous driver.

4.7.4. Post-response emotion and reappraisals

Interview participants were asked to describe their feelings and thoughts in the aftermath of the negative event; that is, throughout the rest of their trip. From these responses, two key subthemes were identified. These subthemes, which relate to escalation and feelings of relief after the event, will now be described.

4.7.4.1. Lack of relief and regret

Although a small handful of drivers did indicate that their aggressive behaviour gave them a sense of relief and their mood improved, most of the interviewed drivers expressed mixed emotions following their reactions. Some drivers described feeling worse and somewhat dejected following their aggressive behaviour, because it had no impact on the other driver, for example:

> *"Because it was like, yeah she took no notice" (Female, 53).*

> *"Frustrated. It didn't change his driving" (Male, 52)*

That is, the failure of the recipient driver to acknowledge the aggression appeared to increase negative feelings rather than relieve them. For other drivers, their responses conveyed a sense of regret and embarrassment surrounding their own aggressive behaviour, as shown by the following:

> *"I felt bad as soon as my partner said it was okay and, like 'he couldn't see you'. I sort of was defensive and angry but then that made me start thinking, like, 'did I overreact or did I, you know, miss that?' Looking back I probably didn't need to raise my hands in the air and say what the f**k" (Female, 30).*

> *"I felt disappointed, both at his actions, and my reaction to the handling of the interruption" (Male, 65).*

> *"I felt bad yeah and I did I felt a bit stupid, I thought that's so immature, grow up, you know two wrongs don't make a right, you must look like a d**khead, and that's, that's no way to respond" (Female, 35).*

Two similarities are evident in these quotations: firstly, they both describe feeling foolish, and both appear to reappraise their behaviour, labelling it as juvenile or unnecessary upon reflection. This is arguably similar to the earlier comments that

describe not feeling better following an aggressive response; however, this embarrassment and regret appeared to be unlikely to discourage future aggressive behaviour, with some drivers indicating that they would be likely to repeat the behaviour in future, for example:

> *"Ideally I'd be more mature, and I just let it happen, so I can have peace of mind for myself that, you know, I don't get annoyed, but, yeah, I probably would do it again" (Female, 33).*

That is, the regret and shame she experienced as a result of her own behaviour appears to be unlikely to prevent it in future.

4.7.4.2. Escalation: a stand-off between two drivers

Although only pertaining to a small subset of interviewed drivers who reported experiencing aggressive retaliation to their own aggressive behaviour, an enriched understanding regarding the cognitive processes involved in escalation was gained from talking to these participants. Comments made by these drivers suggested that feeling unjustly criticised by the retaliation was integral to the escalation. For example, consider the following comments made by a participant who was recalled an incident involving escalation that stemmed from her honking the horn at a truck driver she perceived had put her in danger by making an illegal turn without indicating. She gave the following account of the events that transpired after her honk of the horn:

> *"He indicated for me to wind my window down and told me that I'm the idiot, I shouldn't be besides a truck turning, and I said, 'Well, you know there's wonderful invention called indicators'. He started to use a lot of foul language and everything, I just put the window up and gave him the finger. He gave me the finger back" (Female, 38).*

> *(When describing what the truck driver had said to her when the window was down) "He tried to blame it on me and say,'Well, you should have known, ra, ra, ra', and, yeah, somehow it all became my fault" (Female, 38).*

Clearly this event involves escalation, as evidenced by the successive responses and counter-responses and multiple aggressive behaviours. Her remarks that the truck driver blamed her suggest that she believes she is innocent, as evidenced by her comment that she believed the truck driver tried to make the event

her fault. When she was asked to describe the most negative aspect of the event, the following response was given:

> *"It was just the stupidity of the whole situation that really still gets to me, it's like one simple mistake and he could have put… I was angry and scared, and then when he started, you know, yelling and being abusive, I was just annoyed and somewhat combative at that point, like really, are we going to go this far now" (Female, 38).*

The interpretation of these comments is as follows: driven by her perception that the truck driver was turning illegally, she appeared to feel as though she was within her right to criticise him for his actions. When he responded aggressively to her criticism, she believed it was unwarranted, because she was innocent and he somehow had not understood her initial message or criticism, and hence responded back. She cites the stupidity of the situation as the most negative part of the entire event, and the inference made regarding this remark is that the stupidity refers to his response to her aggression, which she believes is warranted, given his actions. This perceived unwarranted criticism of the other driver's criticism was similarly expressed by another interviewed driver who succinctly summed this up by stating:

> *(Describing the worst part about the interaction) "I'd say it would be the bird afterwards, yeah, because you know not only did you do something to me, then you told me off about it" (Female, 39).*

These comments provide further support to the interpretation in the previous chapter that escalation is essentially an impasse between two drivers who each believe they have been unjustly criticised and thus entitled to retaliate.

4.8. Discussion

The preceding sections have described the results of in-depth follow-up interviews that were conducted with a small sample of drivers participating in the driver diary study. The aim of the interviews was to both augment and complement the information provided in the diaries to achieve a richer understanding of the cognitions involved in driver aggression as they pertain to key constructs of the proposed model. The forthcoming sections will summarise the findings of these interviews, considering them as they relate to the research questions of interest.

Implications of the results as well as strengths and limitations of the study will also be provided.

4.8.1. Discussion of findings in relation to research questions

Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*

Valuable information pertaining to this research question that will help to better understand the underlying reasons why certain events are regarded as provocative was obtained by exploring characteristics that influence driver's initial perceptions of negative events. Firstly, the results suggested that priming effects may generate aggression for some drivers, by attuning them to provocations they experience frequently. Priming effects facilitate information processing by drawing on knowledge stored in memory about a stimulus that has been built up based on earlier exposure to the same or similar stimulus (Huesmann, 1988; Wilkowski & Robinson, 2008). Mirroring this, the results of the second study suggest that there may be a cumulative effect of repeated exposure to the same type of provocation that increases the likelihood of an aggressive response to it for some driver, by making them more alert to perceiving it and raising their expectations of it. However, an interesting insight into the way some drivers conceptualised their aggressive response to such events was obtained: some drivers described aggressive behaviour in response to regularly occurring provocations as pre-emptive, or necessary for them to manage the driving environment, suggesting that they consider their aggressive behaviour to be warranted. Additionally, other results indicative of priming effects suggest that some drivers may anticipate aggressive intentions based on the actions of the offending motorist immediately prior to the event: some drivers stated that they expected the offending driver would engage in the anticipated behaviour and that when it happened, their aggressive response was justified. Thus drivers may make attributions regarding other drivers' intentions before the behaviour has occurred, suggesting that perceptions of some on-road events may begin before they happen.

Furthermore, the results suggest that stereotypes regarding particular types of drivers and vehicles exist, and that they may influence perceptions of these motorists driving behaviour. In addition to comments relating to p-platers, 4WDs, older drivers, and drivers from an ethnic minority background described in the previous

chapter, drivers' perceptions of events involving trucks and utility vehicles appeared to be influenced by negative connotations surrounding the types of people that drive these vehicles. It is acknowledged that these comments may reflect the greater salience these drivers have on the road: all these groups of drivers have distinguishing characteristics that make them stand out from other drivers, thus their driving behaviour may be more memorable than that of other vehicles. However, given that the negative remarks that accompanied descriptions of these events appear to reflect broad generalisations about these types of drivers, this pattern appears to be more consistent with stereotypes facilitating the processing of events involving these groups of drivers.

Interestingly, the comments of female drivers and younger drivers classified under this theme reflected elements of the concept of stigma. Stigma is defined as a trait, or attribute (e.g., gender, race) that is associated with negative connotations that demean that particular group. As Crocker, Major, and Steele (1998) state " people who are stigmatized have (or are believed to have) an attribute that marks them as different and leads them to be devalued in the eyes of others". Relevant to the current results, stigma has been shown to have an adverse effect on members of stigmatised groups: because members of stigmatised groups are often aware of the negative associations surrounding their group, they experience a phenomenon referred to as stereotype threat, a belief that they will be judged and treated according to the stigma surrounding the group to which they belong. Stereotype threat appeared to be evident in the current results: female drivers and younger drivers seemed to believe that the negative events they experienced were deliberate attacks on them that stemmed from negative connotations regarding female drivers and younger drivers. Stigma is an incredibly complex phenomenon, and a deeper discussion of its potential role in driver aggression is beyond the scope of the present research program. Nevertheless, these findings suggest that stereotypes and assumptions about particular groups of drivers have an influence on how their driving behaviour is perceived and may promote aggression.

The results were also able to provide insights into the thought processes of drivers who did not perceive aggressive intentions in the actions of a driver whose behaviour they reported as provocative. These drivers appeared to display greater empathy and seemed to present a more positive attitude towards society. Of particular note, there did not appear to be differences in the types of behaviours

reported by motorists who did not perceive aggressive intentions: they all described behaviours to which other drivers attributed aggressive intent (e.g., tailgating, cutting off). This suggests that a driver's behaviour itself may not be particularly important in determining driver aggression and instead highlights the importance of the meaning attributed to behaviour in determining driver aggression. Furthermore, these findings also emphasise the importance that beliefs may have in subsequent appraisals: drivers who did not perceive aggressive intentions appeared to have a more optimistic view of other motorists, whereas drivers who did perceive aggressive intention appeared to have pessimistic and arguably cynical opinions of other drivers.

Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*

Two different cognitions and beliefs that appeared to be associated with increasing driver aggression were apparent in the results: beliefs regarding the ostensibly poor standards of other motorists' driving behaviour and beliefs or expectations regarding appropriate driving etiquette.

With respect to driver etiquette, the findings expand upon comments forming the same theme in the previous chapter, allowing for a clearer understanding of driver etiquette and its relationship to driver aggression to be achieved. Drivers appear to conceptualise appropriate driving etiquette as behaviour that goes above and beyond the legal road rules to demonstrate thoughtfulness and regard towards the needs and safety of other drivers and to show a willingness to make their trip easier rather than causing them inconvenience. In addition, the comments encapsulated in this theme also suggest that perceptions that another motorist had violated driver etiquette by not adhering to this implied code of conduct were a precursor to aggression for many motorists.

It was particularly apparent in interview comments regarding driver etiquette that, despite an apparent expectation for appropriate etiquette to be displayed, many drivers also appeared to consider displays of poor driver etiquette to be widespread, such that some drivers described the general driving environment as stressful. Specifically, some drivers reported that they felt as though they the needed to be constantly alert to drivers who behave poorly, which coupled with the normal attention required to drive safely, made them feel like the road environment is a

stressful, difficult place to navigate. These comments raise questions regarding the effect of stress on driving performance. Arguably, a motorist's driving performance would be negatively affected if the driver is feeling stressed or splitting their attention between safely operating their vehicles and remaining alert to poor driving behaviour. There is extensive evidence demonstrating the negative effect stress has on driving performance, and the negative effects of driver distraction are well documented (Gulian et al., 1990; Hartley & El Hassani, 1994; Hennessy & Wiesenthal, 1997; Young & Regan, 2007). As such, the apparent belief that poor etiquette is widespread may have implications for driver's safety that extend beyond the implications for driver aggression.

Further, the findings that displays of poor driver etiquette were considered to be widespread by drivers in the current study could also suggest that there may be a culture of driver aggression in Australia. As Yagil (2001) states, "when driving culture is aggressive, drivers are likely to make more hostile attributions, simply because they have a great deal of experience with inconsiderate aggressive drivers" (pg. 129). In line with this, some drivers in the current study reported that they frequently encounter rude, discourteous driving, to which they responded to aggressively. As such, it may be considered common in Australia to display poor driving etiquette, which would then be likely to promote negative attributions for on-road events. Further, perceptions of what constitutes appropriate driving etiquette may also be subject to cultural differences with findings of the present study suggesting that local drivers appear to interpret or consider behaviours such as horn honking as a negative form of communication. However, drivers in the second study who had driven internationally (Italy and Thailand) reported that horn honking is perceived as a positive or neutral form of communication, informational in nature rather as a means to criticise or convey anger. Recent statistics from the Australian Bureau of Statistics (2015) indicate that 28% of Australian citizens were born overseas; if these migrant drivers likewise learnt to drive in their country of origin, they are likely to have their own conceptualisations of what is considered to be appropriate driving behaviour. As such, migrant drivers may arguably be at greater risk of encountering aggressive retaliation; for example, a foreign driver who honks their horn at another motorist with non-aggressive intentions may receive an aggressive response from the target driver in retaliation, because they have perceived the honk as an insult or rude behaviour. Moreover, when considered alongside the

findings suggesting negative stereotypes surrounding drivers from ethnic minorities documented in the previous chapter, it is possible that the aggression from the retaliating motorist may be stronger because they are based on these stereotypes. As such, these findings highlight the need for future research to consider culture differences in driving behaviour.

In addition to beliefs regarding driver etiquette, the results also highlighted that many drivers appear to regard the standards of other motorists driving behaviour as poor, to the extent that some described poor driving as widespread and expected. Furthermore, suggestions that drivers regard poor driving behaviour from other motorists as widespread were also apparent in results indicating that drivers experience acts of driver aggression as a criticism of their own driving behaviour: the drivers in the sample used for the second study considered aggression directed towards them as pressure to conform to the poor driving standards that most motorists ostensibly display.

These comments by interviewed drivers suggesting that poor driving standards are widespread may be indicative of confirmation bias; the tendency of individuals to seek out information in the driving environment that confirms what they already believe (Nickerson, 1998). A driver's beliefs provide the lens through which their driving environment is perceived, thus drivers may be primed by their beliefs regarding what behaviour they can expect on the road to notice behaviours that confirm that expectation. To that end, section 3.12.1 of the previous chapter called attention to questions concerning why driver etiquette does not seem to be shown, despite the apparent shared expectation for it evident in diary comments. It was suggested in the previous chapter that although many drivers' statements imply that they expect good driver etiquette, perhaps a more accurate explanation is that driver's may believe etiquette should be shown, but expect that it will not. This was reflected in the current results: on the one hand, drivers appear to believe that motorists should show appropriate driver etiquette; however, they also describe poor etiquette as widespread and general driving standards as poor. As such, it is possible that drivers' apparent belief that poor etiquette is widespread raises their expectations for encountering behaviour that shows poor etiquette, thus reinforcing the initial belief. However, as will be described in the discussion of the results pertaining to the next research question, drivers may be unwittingly perpetuating the behaviours they object to by responding aggressively to them.

Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

Examining drivers' comments regarding the reasons for their responses to the events they encountered helped to explicate some of the psychological processes underlying aggressive and non-aggressive responses.

Firstly, extending on the themes that emerged in the driver diaries, the findings suggest that for many drivers, the purpose of their aggressive behaviour appears to be to shame or criticise and communicate disapproval of the target motorists' behaviour. Responses such as these were considered aggressive in line with the definition of aggression used in the program of research, because drivers appeared to hope that their behaviour would have a negative impact on the target driver that would provide the impetus to amend their driving behaviour.

Although responses designed to teach a lesson were evident in most comments comprising this theme, some variations in how drivers aimed to teach this lesson were apparent. For instance, consistent with the literature on driver vengeance (see section 2.10.1), some drivers described responses that appeared to be motivated by revenge, to 'even the score' and show the target driver what it is like to be on the receiving end of poor behaviour. Alternatively, some drivers appeared to conceptualise their aggressive behaviour as a way of defending themselves, with the intention that it would show that they would not tolerate poor driving behaviour; whereas others described engaging in dangerous behaviours that risked causing a collision with the target driver, presumably with the intention that it would frighten the target driver. Nevertheless, a similar underlying purpose observed in all types of responses: to communicate disapproval of the target driver's behaviour.

Furthermore, drivers who perceived they had been the victim of another drivers' aggressive behaviour (e.g., being tailgated) appeared to regard the aggressors behaviour an unjust criticism of their driving. When this finding is considered alongside findings suggesting that drivers who engage in aggressive behaviours do so to criticise the target driver, they may indicate that the interpretations drivers on the receiving end of aggression make may be accurate: drivers who report being the victim of aggressive driving behaviour appear to perceive the same intent behind the aggressive behaviour as those who report driving aggressively. However, a brief discussion of the literature concerning the relationship between perceptions of

injustice, disrespect, and anger has the potential to further augment understanding of these apparent underlying motivations for aggressive driving behaviours.

Substantial evidence exists demonstrating that a perception that one has experienced disrespect is an interpersonal antecedent for anger and aggression, because disrespectful treatment is regarded as unjust (Bettencourt & Miller, 1996; Lupfer, Weeks, Doan, & Houston, 2000; Mikula, 1993; Skitka, 2009). Moreover, literature concerning the types of behaviour considered disrespectful bears many similarities to the way provocative events are described in the diary entries under discussion. Specifically, perceptions of disrespect result when an individual feels they have failed to receive something basic that they believe they are entitled to, namely, polite, respectful treatment from others. Furthermore, a common source of perceived disrespect is perceived breaches of interpersonal codes of conduct (Mikula, 1993; Miller, 2001). This can be applied to the current results: drivers who described experiencing negative emotions such as anger in response to events that they regarded as rude, discourteous, and in violation of their apparent expectations concerning the way that drivers should behave, arguably, perceived that a code of social conduct had been breached. Additionally, many drivers whose comments formed the driver etiquette theme explicitly stated that they felt angered by the provocative events they experienced, because they found them disrespectful. Thus extrapolating from the literature regarding the association between disrespect and aggression to the current research, it is possible that driver aggression may be triggered in response to perceived violations of etiquette, because they are considered disrespectful, and thus unjust. However, an important caveat noted by Miller (2001) must also be considered: aggressive acts committed in the absence of an underlying justification are viewed particularly unfavourably, and as such, perceptions that one has experienced injustice may simply a way of accounting for aggressive behaviour.

Further similarities between the current results and literature regarding the association between disrespect and aggression are also evident. To elucidate, section 3.11.1 of the preceding chapter notes that violations of driver etiquette may trigger anger in some drivers because they also violate common perceptions of what constitutes appropriate moral behaviour, which generally emphasise treating others with respect. Mirroring this in the literature on disrespect, Heider (1958; cited in Blumstein & Weinstein, 1969; Wright, 1989) argues that members of any society are

subject to "ought forces", implicit norms, rules, or expectations about how members of the community should behave to conduct themselves in a moral manner, which are reflected in the current results through drivers' descriptions of how they believe drivers ought to behave in the driving environment. Heider further argues that there is a widespread assumption that all members of a community should respect these norms in order for it to function smoothly. Consequently, infringing on these norms offends and threatens the moral integrity of society, and it can incite anger and a desire to reprimand the offender (Vidmar, 2002; Wenzel & Thielmann, 2006). To illustrate using the example provided by Miller (2001), queue jumping is a norm violation that triggers considerable anger. In particular, Miller asserts that the anger that arises from queue jumping stems from the "perceived disrespect the intruder has shown the system of social rules under which all members of the moral community are expected to live" (p. 535). Similarly, drivers in the current study experienced anger in response to events such as cutting off, or driving into a merging lane, because they regarded it as "pushing in," with one driver quoted in Study 1 remarking "*You're a cheater! We saw you pushing in! We've been here for ages! Wait your flaming turn!*" As such, it is possible that violations of driver etiquette may trigger driver aggression, because they threaten standards that motorists expect for the driving environment to run smoothly.

Finally, it has been suggested that disrespectful treatment is perceived as unjust because it tarnishes one's self-image: it deprives individuals of the respect they believe they deserve, based on this image (Miller, 1993; Rodriguez Mosquera, Fischer, Manstead, & Zaalberg, 2008). As such, aggressive retaliation to perceptions of disrespect are considered a form of self-preservation that is regarded by the aggressor as necessary in order to protect or restore one's self-image (Tedeschi et al., 1974). This may have relevance to the current findings, because evidence provided in the literature review indicates drivers have a tendency to consider their own driving behaviour as superior to that of other motorists. Accordingly, drivers may respond aggressively to on-road behaviours they consider discourteous and perceive as unjust or disrespectful, because they regard themselves as a good courteous drivers who do not deserve such treatment. Therefore, it is possible that in addition to motivations to teach another driver a lesson, that some acts of driver aggression may also have somewhat selfish motivations: drivers may be communicating to the target driver that they should show respect to good drivers, and in doing so, are seeking to preserve or bolster their own self-image as a good driver. Consequently, suggestions that disrespectful treatment is

considered unjust because it threatens self-image also appear to be consistent with evidence documenting an association between ego threat and social rejection.

Robust evidence exists demonstrating that threats to one's ego and social rejection are interpersonal antecedents of aggression, and further, that many drivers regard their driving as superior to that of other motorists. When this is considered alongside the current results suggesting that driver aggression is perceived as criticism, further potential links to ego threat and social rejection are apparent. A driver who regards their driving as superior may perceive aggression directed towards them as an unjust criticism, thus threatening the ego surrounding their driving skills. Aggressive retaliation to communicate to a driver that they should improve their driving may help to restore their image of themselves as a superior driver. Likewise, elements of social rejection are apparent in findings: a driver who believes they are a good driver, and perceives driver as a criticism intended to coerce them into adhering to poor driving standard may perceive aggression from other drivers as a form of social rejection: their driving does not fit in with others.

Just as researchers studying human aggression have noted the paradox of using an undesirable behaviour like aggression to restore image following threat or rejection, the paradox inherent in the findings of the current study when they are considered together must be discussed. Specifically, the results thus far suggest that drivers appear to believe that motorists should demonstrate appropriate etiquette towards fellow drivers but may expect that this standard will not be met. Furthermore, the results also suggest that driver aggression in response to negative or anger provoking events, such as etiquette violations, is intended to send a driver a message that their behaviour is unacceptable and to teaching them that they should drive more appropriately. Thus paradoxically, drivers appear to respond to rude behaviour with their own rude behaviour, with the intention that it may discourage future rude behaviour from the target driver. However, given that the target driver is likely to perceive this lesson as an unjustified criticism, they feel warranted in responding with aggression. As a consequence, if the driver on the receiving end of the initial aggressive behaviour believes that their driving is superior and that most other motorists' driving is poor, his or her experience of what they consider an unjustified attack on their driving behaviour is likely to reinforce the belief that most other motorists are rude, bad drivers. Thus, it is in this sense that, although drivers may be intending to teach a lesson with their aggressive behaviour, they are likely to be perpetuating the rude behaviours that they

are ostensibly seeking to change. This interpretation of the findings is consistent with a self-fulfilling prophecy, which will be discussed in-depth in section 6.3.

Alternatively, findings regarding non-aggressive responses to anger provoking events suggest that some drivers refrain from responding aggressively because they fear subsequent aggressive retaliation. Comments comprising this theme revealed that some drivers believe that road violence is common and refrained from an aggressive response to protect themselves against violent counterattacks. This suggests that although they promote inaccurate ideas about how prevalent road violence is, media reports of extreme events may have positive effects in that fear of escalation may deter some drivers from engaging in aggressive behaviours.

While the diaries revealed that some drivers appeared to refrain from responding with aggression to anger-provoking events because they believed that aggressive behaviour would be degrading to them, this did not emerge strongly enough in the interviews to allow for further elaboration on this unique finding. While one diarist stated that refraining from responding made her feel like the more courteous driver, most drivers described failing to respond because they considered it pointless or feared retaliation. However, because interview participants who did not respond aggressively only represented a small proportion of the sampled drivers, there may not have been enough drivers who endorsed this theme included in the current sample to allow for elaboration.

The interviews provided an opportunity to discuss drivers' feelings after they had responded aggressively. The results revealed that, for the drivers in this sample, the negative emotions generated by the event did not dissipate after an aggressive response, and many described feeling worse following their own aggressive behaviour: some drivers described regretting their behaviour, whereas others described feeling foolish or immature after their aggressive response. Remarkably though, these drivers stated that they would be likely to engage in the same aggressive response again, despite regretting it afterwards. This finding is interesting and somewhat counterintuitive when considered in light of comments from the diaries and from the interviews where drivers described regularly responding with aggression to negative events. Intuitively, it would follow that if drivers frequently use aggression; they must experience a benefit or positive effect from it. Thus these findings raise questions regarding how aggressive driving behaviours are perpetuated: the behaviours do not

appear to be effective in modifying driver behaviour, and they do not appear to bring positive emotions for drivers who engage in it. As such, it would appear that driver aggression may be the result of deeply ingrained, automatic processes that involve little conscious effort. Furthermore, consistent with evidence regarding catharsis cited in the literature review, the current results suggest that purging or conveying ones negative feelings regarding another driver's behaviour increases rather than decreases the negative emotions generated by it. Consequently, these findings fit with the conclusion discussed above that drivers may perpetuate their own experiences with aggression.

Finally, the findings of the current study build on the findings of the first study to elucidate some of the processes involved in driver aggression events that escalate. Supporting interpretations made based on diary comments, the results of the second study also imply that escalation is primarily an impasse between two drivers who both believe that the other is at fault and that their aggressive response is justified. Interestingly, study two provides an additional finding that drivers involved in events that escalated described aggressive retaliation to their own aggression as the most negative aspect of the event, rather than the initial triggering event.

4.8.2. Implications for the model

Consistent with the goal of the study, the findings of the interviews have helped achieve an enriched understanding of the cognitions involved in driver aggression at key constructs of the model. Implications for the model are apparent in findings that driver aggression often increases rather than decreases subsequent negative emotion; these results imply that by responding aggressively, drivers may inadvertently increase their likelihood of responding with anger and aggression to future events encountered in their journey. Furthermore, the results suggest that perception and appraisal of on-road events are influenced by priming effects and stereotypes regarding different vehicles and types of drivers, thus implying that some drivers may be more at risk for experiencing aggression.

However, the perhaps the most important implication for the model based on the current study stems from findings highlighting the importance of the beliefs that drivers hold about other motorists and the general driving environment. Specifically, the results suggest that many drivers believe that the behaviour of most other motorists is substandard and that they are likely to encounter poor driving behaviour

from other motorists. Thus an important implication of these results for the model is apparent: the cyclical process the model depicts may hinge on what drivers believe about the driving environment. A driver's beliefs will influence what events they are attuned to, and the perception of on-road behaviours that may then instigate the cyclical process. In particular, one shared belief identified in the current study was a belief that the standard of driving of most other motorists is poor. Accordingly, a driver who believes that the behaviour of motorists is substandard is likely to view their driving environment such that they are alert to instances of behaviour that fit this belief, and will be apt to perceive driving behaviour in a manner that is consistent with this belief. That is, they are likely to find evidence in their driving environment that matches their existing beliefs and behave in a way that reinforces these beliefs, making them more readily primed in future.

4.8.3. Strengths and limitations

The second study had a number of strengths and limitations that must be acknowledged. Firstly, the design of the study and the approach it took represents a strength. As noted in section 4.5, the interviews were considered to be a means of triangulation of methods, using the same sample of participants from Study 1 whereby the in-depth interviews were used to complement, enhance and enrich the information gained from the diaries. Adopting this rigorous approach to explore an under-investigated area of road safety allowed for the development of a rich understanding of the cognitions involved in driver aggression. Additionally, the use of purposeful sampling and semi structured interviews constitute strengths of the current study. Recruiting interview participants based on a set of selection criteria that reflected the model meant that those with the greatest potential to contribute insightful thoughts and comments to help improve understanding of cognitions at each stage of the model were included in the sample. Further, adopting a semi-structured approach to the interviews ensured that participants were asked the most relevant questions, while allowing for exploration of emergent discussions.

However, there are limitations to the second study that should be discussed. Firstly, as noted, the interviews were conducted within 48 hours of the participant's diary being received. While this was done to help mitigate the effects of declines in memory recall, it meant that some participants who met the criteria had to be excluded on the basis of their limited availability. Furthermore, although recent

events were discussed in the interviews, and measures were put in place to limit declines in memory, it must be recognised that is possible that some drivers were discussing events that took place up to four days ago. Although this approach was considered more advantageous than asking drivers to reflect on any aggressive event they may have experienced, or using voice recordings to capture responses in real time (see section 2.9.1.4), it must be acknowledged that participants' recall of the event is still likely to have declined.

Additionally, there may be limitations resulting from the increased potential for social desirability to influence responses because of the lower levels of anonymity offered in interviews as opposed to diaries. To elaborate, as described in section 3.4, participants were protected by the anonymity afforded in online interactions when they were completing the diaries: they had no personal contact with the researcher outside of electronic communication. However, the interviews involved the participants and researcher having a one-on-one discussion over the phone, reducing that level of anonymity. Therefore, there is greater potential for social desirability biases in participant's responses, stemming from wanting to make a good impression and to present themselves in a favourable light. However, although this limitation must be acknowledged, there are some ways in which the influence of social desirability biases may have been mitigated. Specifically, participants were selected on the basis of content in their diaries, which was provided when they were completely anonymous. Moreover, in light of the findings of the research thus far, it is possible that social desirability may be less of an issue when discussing driver aggression. To elucidate, the findings suggest that many drivers consider their own aggression to be justified, because they believe that the target driver behaved in a manner that deserved it. As such, drivers may be less concerned about presenting themselves in a favourable light when discussing aggressive behaviours that they consider warranted.

Additionally, it is acknowledged that female drivers were overrepresented in the study, and thus the perspectives offered may be skewed towards the perceptions of female drivers. However, as described in section 3.6.3, participants were not asked to disclose their gender until the final diary had been completed. As such, the participant's gender was not known at the time they were selected for an interview. Furthermore, given that selection criteria were employed to identify interview participants based on the description of their response and their availability to

complete an interview, this gender imbalance was not intentional, and occurred by chance. Nevertheless, in light of the overrepresentation of female participants, it must be acknowledged that they were interviewed by a woman, which may have resulted in experimenter effects (Dindia & Allen, 1992; Rosenthal, 1963, 1966). However, while it must be acknowledged that experimenter effects could have occurred, it is also not possible to determine definitively if this did occur. Further, if experimenter effects did occur, because all interviews were conducted by the same person, the thesis author, it is likely that the effect was standardised across all interviews.

Finally, a limitation of the interviews is that they may have resulted in priming, or may have influenced responses provided in future diaries. Participants could be selected for an interview based on any one of their three diaries, and as such, drivers who were selected on the basis of their first or second diary still had subsequent diaries to complete. Thus, although it is not possible to determine if this occurred and, if so, how the premature interview influenced responses to diaries, it must be recognised as a potential limitation. That is, is possible that ensuing diary responses for participants who completed their interview while the diary component of the study was still in progress may have been influenced by the discussions in the interviews.

4.9. Summary

The above chapter has detailed the second study in the program of research, in-depth follow-up interviews with a subset of driver diary participants to discuss the events reported in their diaries in greater depth. Drivers were selected to take part in a follow-up interview based on a set of selection criteria designed to highlight participants whose diary descriptions of events suggested they may be able to offer insightful information to enhance understanding of cognitions involved in driver aggression at each stage of the model. Semi-structured interviews using questions designed to guide participants through each stage of the model were then conducted with selected drivers. The results of a thematic analysis were presented with respect to the key constructs of the model, followed by a discussion of the results of this analysis in relation to the research questions that guided the study. The subsequent study will utilise the knowledge gained from the previous studies and apply it to build on the findings of previous two chapters and conduct a preliminary investigation of the key

constructs of the proposed model to examine its potential for understanding driver aggression.

Chapter 5: A quantitative exploration of the proposed model

5.1. Introductory comments

This chapter will document the third study of the program of research: a quantitative study investigating the key constructs of the proposed model. The current study builds upon the foundation laid by the previous investigations that explored the cognitions involved in driver aggression to address current gaps in knowledge, applying the information gained from the previous studies to the proposed model, in order to conduct a preliminary investigation of the key constructs of it.

5.2. Study aims and hypotheses

The study had three aims: first, to conduct an initial investigation of the key constructs of the proposed model and apply them to understanding aggressive driving behaviour. Second, the study aimed to examine the contribution of the key constructs of the model under investigation to explaining aggressive and non-aggressive behavioural responses. Third, the study aimed to explore the relationships between each of the constructs in the model. In doing so, the aim of the research was to provide information that would assist in addressing all four key research questions:

- Research Question 1: *What person-related factors (both protective and risk-inducing) influence driver aggression?*
- Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*
- Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*
- Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

In particular, the issues under investigation in this study include:

- The generalisability of the qualitative findings emerging from the previous studies to a different sample.
- Differences in how particular types of on-road provocations are perceived and responded to.

- Exploring the effects of the person-related factors identified earlier in the program of research as potentially increasing driver aggression (i.e., trait anger, anger rumination and hostility) and those identified as potentially protective (i.e., mindfulness and moral identity).
- Investigating the role that cognitions and cognitive processes such as perceptions and attributions play in increasing or decreasing the likelihood of driver aggression.
- Exploring potential relationships between the identified person-related factors and cognitions.

The study was guided by a number of hypotheses derived from the framework provided by the proposed model, the literature review, and the findings documented in the preceding chapters. These hypotheses, insofar as they pertain to the relevant stages of the model, are outlined below.

5.2.1. Initial on-road provocations

Two hypotheses relate to how different types of on-road events are perceived, appraised, and responded to by drivers. As described in section 2.6, while there is some evidence regarding how common different types of on-road events that can trigger aggression are, the underlying reasons why these events are regarded as provocative are not well understood. Consistent with Weiner's (1986) theory that behaviour appraised as being deliberate arouses greater levels of anger and aggression, the findings of the current research have suggested that aggression may occur in response to events where a driver perceives a motorist intentionally disregarded driver etiquette. Thus drawing on the previous qualitative investigations where participants described cutting off behaviours as deliberate and discourteous, it was predicted that on-road events depicting cutting off would attract greater negative emotion and would be responded to with stronger aggressive intentions than events where a driver's progress is impeded, (e.g., slow driving or failure to move at a traffic light). It was considered that in instances where progress is blocked, the offending driver is likely to be also delaying their own progress and that alternative attributions (e.g., a lapse in attention) are more likely.

- *H_1: Drivers who perceive they were cut off will report stronger negative perceptions and emotions and will report stronger endorsement of hostile attributions than drivers who perceive their progress was blocked.*
- *H_2: Drivers who perceive they were cut off will report stronger aggressive intentions for their response to the event than drivers who perceive their progress has been blocked.*

5.2.2. Demographic and person-related factors

Three hypotheses regarding demographic and person-related factors will be examined. Hypothesis three is drawn from the literature reviewed in Chapter 2 that suggests that when compared to the general driver population younger drivers are more likely to instigate, and perceive themselves as being the recipients of, greater levels of driver aggression than the general driving population. Although the role of gender will be explored, no hypotheses have been proposed regarding its role, because the current literature does not provide substantial evidence to indicate any significant gender differences in non-violent driver aggression (see section 2.8.1).

Hypotheses four and five examine person-related factors thought to both increase driver aggression, and protect against it. Hypothesis four will examine two factors, mindfulness and moral identity, identified in both the literature review and Study 1, as having the potential to protect against driver aggression. Hypothesis five examines the role of three person-related factors identified in the literature review (see section 2.8.2) that are believed to increase driver aggression: anger rumination, hostility, and trait anger.

- *H_3: There will be a significant effect of age such that younger drivers will report stronger aggressive intentions with their behavioural response to potentially provocative on-road events.*
- *H_4: There will be a significant effect of trait mindfulness and moral identity such that greater mindfulness and moral identity will be associated with weaker aggressive intentions accompanying drivers' behavioural responses to potentially provocative on-road events.*
- *H_5: There will be a significant effect of trait anger, rumination and hostility such that higher scores on these variables will be associated with stronger*

aggressive intentions accompanying drivers' behavioural responses to potentially provocative on-road events.

5.2.3. Cognitive factors

Four predictions regarding driver cognitions and the cognitive processes involved in perceptions and appraisals of potentially provocative on-road events are proposed. Hypothesis six draws on literature reviewed in Chapter 2 demonstrating a strong relationship between a driver's tendency to attribute hostile intentions to another driver's actions and the aggressiveness of his or her subsequent responses. Hypothesis seven draws on both Weiner's attribution theory and evidence documented in Chapter 2 that demonstrates the actor-observer effect in the driving context; that is, the tendency to overemphasise internal, stable characteristics when making causal attributions about someone else's poor driving behaviour.

- *H_6: There will be a significant effect of hostile attributions such that stronger endorsement of hostile attributions will be associated with stronger aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.*
- *H_{7a}: Internal-stable causal attributions will be the most strongly endorsed type of attribution across all the potentially provocative on-road events.*
- *H_{7b}: There will be a significant effect of internal-stable attributions such that stronger endorsement of these attributions will be associated with aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.*

Hypothesis eight stems from Yagil's (2001) findings, which highlight the importance of beliefs about other drivers in influencing driver aggression. Yagil's results suggested that the fundamental ways that drivers think about and conceptualise their driving environment affect their expectations for driving behaviour and attributions for behaviour. Drawing on Yagil's work, the previous qualitative investigations of the current program of research explored and identified some common, shared ways that drivers conceptualise the driving environment in ways that may influence aggression. Based on Yagil's findings, it is likely that these identified conceptualisations influence driver aggression through the expectations they generate. Accordingly, the final study sought to investigate the generalisability of these

identified cognitions by exploring their influence on aggressive intentions. As there were five cognitions identified, hypothesis eight has several subcomponents that seek to explore the unique influence of each of the identified cognitions on driver aggression. To contextualise these predictions, the identified cognitions will be briefly recapped.

Four cognitions that appear to be associated with increased driver aggression were identified in the previous studies. Firstly, potential priming effects were identified such that many drivers appear to believe that community-wide driving standards are poor and thus expect to encounter poor driving behaviour on the road. Secondly, some drivers appear to experience negative reactions when they encounter behaviour that they perceive has breached their expectations or belief that drivers should be polite and courteous in their interactions with other drivers. Thirdly, for many drivers, their aggressive responses to on-road events appeared to suggest that the underlying purpose of their aggressive response was to "teach a lesson" (i.e., to criticise the target driver and convey to them that their behaviour was inappropriate), suggesting that these drivers may believe that poor driving deserves to be reprimanded. Fourthly, a number of negative stereotypes regarding certain types of vehicles and drivers that appeared to influence the appraisal of these groups of motorists' behaviour were identified. In addition, an unexpected cognition that may be protective against driver aggression emerged in the first study (as described in Chapter 3). Specifically, some drivers described experiencing a sense of satisfaction, or even superiority when refraining from responding aggressively to on-road events that they led them to feel angry or frustrated. The hypotheses reflecting each of these cognitions are:

- *H_{8a}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that one can expect poor driving from other motorists will be associated with aggressive intentions with one's behavioural response to potentially provocative on-road events.*
- *H_{8b}: There will be a significant effect of cognitions about one's driving environment such that stronger endorsement of negative reactions to poor driver etiquette will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.*
- *H_{8c}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that poor driving deserves to be*

criticised will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.

- *H_{8d}: There will be a significant effect of cognitions about one's driving environment such that stronger endorsement of negative stereotypes about other groups of drivers will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.*
- *H_{8e}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that one should set a positive example through one's own driving behaviour will be associated with weaker aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.*

Hypothesis nine reflects one of the arguments of the program of research, and a key construct of the model, that the perception and appraisal of on-road events will influence subsequent behavioural responses.

- *H_9: There will be a significant effect of the cognitive processes involved in perceiving and appraising on-road events such that:*
    - *H_{9a}: Stronger negative perceptions towards potentially provocative on-road events will be associated with stronger aggressive intentions with drivers' behavioural responses to them; and*
    - *H_{9b}: Stronger negative emotions generated in response to potentially provocative on-road events will be associated with aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.*

Additionally, a number of predictions are proposed regarding the relationships between person-related and cognitive factors. The previous chapters have identified cognitions that reflect some common ways that drivers appear to conceptualise their driving environments and the impact of these on aggression. Additionally, the literature review highlighted some key person-related factors that have strong theoretical links to driver aggression. For the purpose of an exploratory investigation of the model, the effect of person-related factors and cognitive factors are explored independently in order to determine their unique contribution to both aggressive and non-aggressive responses to on-road events. However, in accordance with the

literature reviewed in Chapter 2 which suggested that some person-related factors may influence aggression through the cognitions they generate, there will also be a focus on the relationships between person-related factors and cognition. This will assist in providing well-informed directions for future research aimed at exploring interactions between these factors. These predictions are as follows:

- *H_{10}: Mindfulness and moral identity will be positively correlated with each other, but negatively correlated with anger rumination, anger, and hostility.*
- *H_{11}: Cognitions and cognitive processes will be positively associated with trait anger, anger rumination, and hostility such that:*
    - *H_{11a}: Cognitions identified as likely to increase driver aggression will be positively associated with trait anger, anger rumination, and hostility; and*
    - *H_{11b}: Negative perceptions of potentially provocative on-road events will be positively correlated with trait anger, anger rumination, and hostility; and*
    - *H_{11c}: Negative emotions generated in response to potentially provocative on-road events will be positively correlated with trait anger, anger rumination, and hostility.*
- *H_{12}: Cognitions identified as likely to increase driver aggression will be negatively correlated with mindfulness and moral identity.*
- *H_{13}: Cognitive processes will be negatively associated with mindfulness and moral identity such that:*
    - *H_{13a}: Negative perceptions of potentially provocative on-road events will be negatively correlated with mindfulness and moral identity; and*
    - *H_{13b}: Negative emotions generated in response to potentially provocative on-road events will be negatively correlated with mindfulness and moral identity.*

5.2.4. The model

Finally, reflecting one of the key aims of the program of research, the study will examine the utility of the proposed model of driver aggression by exploring the extent to which the combined effect of the constructs of the model can explain aggressive and non-aggressive behavioural responses, what constructs of the model contribute the most towards explaining driver aggression, and which aspects require further investigation. Accordingly, the final hypothesis reflects the arguments presented in Chapter 2 that cognition and cognitive processes that determine how events are appraised and perceived are important determinants of aggression.

- *H_{14}: The identified cognitions and cognitive processes will be more strongly associated with aggressive intentions accompanying behavioural responses to potentially provocative on-road events than person-related factors will be.*

5.3. Method

5.3.1. Recruitment

Organised in conjunction with QUT's media department, journalists at the *Brisbane Times*, a popular digital news website, were enlisted to assist in recruiting a large and diverse sample of study participants from across Queensland. The website ran a story calling for readers to participate in the study. The study was described as investigating the role of attitude in the perception of driving events, including those that can result in aggression. The article included a direct link for interested readers to follow to register for the study. A copy of this article can be found in Appendix C.

Media advertising was complemented with convenience sampling that was undertaken by distributing emails that promoted the study to several QUT mailing lists, as well as advertising the study on the QUT and CARRS-Q website and social media pages. To supplement the number of younger drivers in the sample, the study was advertised to undergraduate university students in exchange for course credit. Eligible participants were required to hold a current driver licence (excluding learner permits), have reliable access to the internet, and reside in Queensland.

5.3.2. Participants

A total of 430 people ranging in age from 17 to 77 (M = 39.88, SD = 13.66 years) completed the study. Over half (55.6%) of the participants were women. Participants drove an average of almost nine hours each week (M = 8.73, SD = 7.44)

and had held a drivers licence for an average of 21 years (M = 21.14, SD = 14.02). Almost the entire sample (87.4%) learnt to drive in Australia and approximately half stated that they drive primarily to commute to and from work (50.2%). Most participants were employed full-time (53.7%) and had completed tertiary level education (55.4%). A comprehensive overview of the sample characteristics can be found in Table 5.1.

Table 5.1.Demographic characteristics of current sample.

	Total Sample (***N*** **=430)**		**Males** (***n*****=191)**		**Females** (***n*** **=239)**	
Demographic (*M*/*SD*)						
Age	39.88	(13.66)	44.33	(14.15)	36.32	(12.15)
Years with licence	21.14	(14.02)	26.13	(14.60)	17.08	(12.14)
Hours driven per week	8.73	(7.44)	9.61	(8.40)	8.02	(6.50)
Highest Education (*n*/%)						
University	238	(55.4%)	102	(53%)	136	(56.9%)
TAFE or trade	104	(24.2%)	61	(31.9%)	43	(18%)
Senior high school	73	(17%)	22	(11.5%)	51	(21.3%)
Junior high school	15	(3.5%	6	(3.1)	9	(3.8%)
Employment Status (*n*/%)						
Full time	231	(53.7%)	122	(63.9%)	109	(45.6%)
Part time/Casual	74	(17.2%)	17	(8.9%)	57	(23.8%)
Self employed	28	(6.5%)	16	(8.4%)	12	(5%)
Student	40	(9.3%)	9	(4.7%)	31	(13%)
Retired	22	(5.1%)	17	(8.9%)	5	(2.1%)
Unemployed	13	(3%)	7	(3.7%)	6	(2.5%)
Parent/Carer	17	(4%)	2	(1%)	15	(6.3%)
Other	5	(1.2%)	1	(.5%)	4	(1.7%)
Driving purpose (*n*/%)						
Commuting to work	216	(50.2%)	95	(49.7%)	121	(50.6%)
Leisure and errands *(includes childcare duties)*	177	(41.2%)	68	(35.6%)	109	(45.6%)
Driving as part of job	36	(8.4%)	28	(14.7%)	8	(3.3%)
Other	1	(0.2%)	0	(0%)	1	(0.4%)

5.3.3. Experimental design

In designing the study, it was recognised that experimental, naturalistic, and simulated methods would not be suitable given that driver behaviour does not lend itself well to experimental manipulation, and practical and ethical issues surround the study of aggression in simulated or naturalistic settings (af Wåhlberg et al., 2010). Furthermore, observational methods were not considered appropriate, because the constructs under investigation in the study are internal processes such as thoughts

and perceptions, which cannot be readily observed. Accordingly, a self-report questionnaire containing purpose-designed items to assess cognitions regarding an on-road provocation and standardised measures of person-related constructs was considered to be the most appropriate method for the current study. Although self-report questionnaires are widely used in driver aggression research, they carry with them issues of social desirability. While social desirability in self-report measures can never being completely eliminated, careful design and manipulation of the variable can minimise its adverse effects (Mitchell & Jolley, 2012).

The current study utilised an online questionnaire where the experimental manipulation was the type of potentially provocative on-road event depicted in a short video vignette. Vignettes are widely used in road safety research (e.g., Lennon et al., 2011; Lustman, Wiesenthal, & Flett, 2010; O'Brien et al., 2004) due to their ability to bring a high degree of consistency and standardisation to stimulus materials (Alexander & Becker, 1978). Rather than use the traditional written vignette, the current study capitalised on the advent of dashboard cameras (widely known as dashcams) to use video vignettes depicting naturalistic footage of real-life, on-road events. Dashcams are inexpensive and widely available video cameras that sit on the dashboard or windscreen of a vehicle, to capture events occurring directly in front, thus providing a first-person view of these events (Chen, Chen, Chen, Tsai, & Chen, 2014). The footage used in the current study was obtained by placing high-definition GoPro cameras inside the front windscreen of the personal vehicles of two research assistants to film their daily commutes and capture real-life footage of exemplar events reflecting the common provocations described in the first two studies of the current program of research.

To ensure that the events presented to participants in video vignettes were likely to be ones that they had experienced in their regular driving, it was intended that four video vignettes, each one depicting one of the four most frequently described events documented in Chapter 3, would be used as stimuli. Based on the content analysis conducted in Chapter 3, the four most frequently described events in drivers' diaries were cutting-off behaviours (e.g., inappropriate lane changing or merging), dangerous driving (e.g., tailgating), blocked progress (e.g., slow driving, inappropriate use of traffic lanes) and rude or aggressive behaviours (e.g., receiving a horn honk). However, early on in the filming process, some issues became apparent in capturing two of these types of events: dangerous driving and rude behaviour. Specifically,

because dashcams best capture the perspective of the driver and thus the events occurring directly in front of the vehicle, events classified under the category of dangerous driving, such as tailgating, could not be recorded. Similarly, dashcams cannot capture sounds occurring outside the vehicle and cannot adequately record the view from either the driver or passenger side of the vehicle, thus it was challenging to depict enough information to contextualise an event where the driver experienced rude or aggressive behaviours (e.g., gestures or horn honks).

Since the anticipated four events could not be filmed, the decision was made to use two video vignettes for each of the two types of events that were amenable to being filmed with a dashcam (cutting off and blocked progress), to enhance the robustness of the findings relating to each of these types of events. It was anticipated that using two video vignettes for each type of event would capture more detailed information about responses to these types of events than assessing just one particular instance of the event. Filming was carried out for one month until suitable clips of exemplar events had been obtained, with the footage reviewed after each commute to search for occasions where the research assistants reported experiencing these exemplar events.

A between-groups design where participants responded to one of four randomly assigned videos vignettes was adopted for the current study. Although a repeated measures design offers greater statistical power (Aron, Aron, & Coups, 2009; Field, 2013), there were a number of reasons for the selection of a between-groups design. Firstly, a between-groups design helped to keep the time taken to complete the questionnaire manageable. In its final version, with participants responding to one vignette, the questionnaire took approximately 30 minutes to complete. A repeated measures design would have added an additional three vignettes and collecting participant responses to each would have increased the duration of the questionnaire quite considerably, to almost two hours. A questionnaire of this length would have been likely to create a number of issues. Firstly, reaching the required sample size (see section 5.3.9) would have been problematic, as it is likely that fewer participants would be willing to complete a questionnaire that would take almost two hours of their time. In addition, a long questionnaire increases the potential for participants to become bored or fatigued, which may lead them to make careless responses in an effort to finish. Alternatively, it is also possible that some participants may become irritated or frustrated by the

length of the questionnaire and their perceptions of the event shown in the vignette and responses to subsequent items could be unduly influenced by irritation stemming from the questionnaire itself rather than from the on-road event. To that end, the key reason a between-groups design was employed was to mitigate the effect that cumulative exposure to provocative on-road events may have had on the responses of the participants.

A copy of the questionnaire is provided in Appendix B. The order in which the measures were presented to participants is depicted in Figure 5.1, and was intended to mirror the order of the cyclical process depicted in the model. Demographic information, such as age and gender, was collected first, followed by responses to the person-related constructs, which were assessed using standardised instruments. Participants then viewed one of four (randomly allocated) video vignettes designed to show a potentially provocative driving event that the first two studies of the research program had identified as a trigger for driver aggression. Following the presentation of the video vignette, participants responded to a number of purpose-designed items assessing their cognitions in response to the potentially provocative event shown, their likely behavioural responses to it, and the intended purpose of that response.

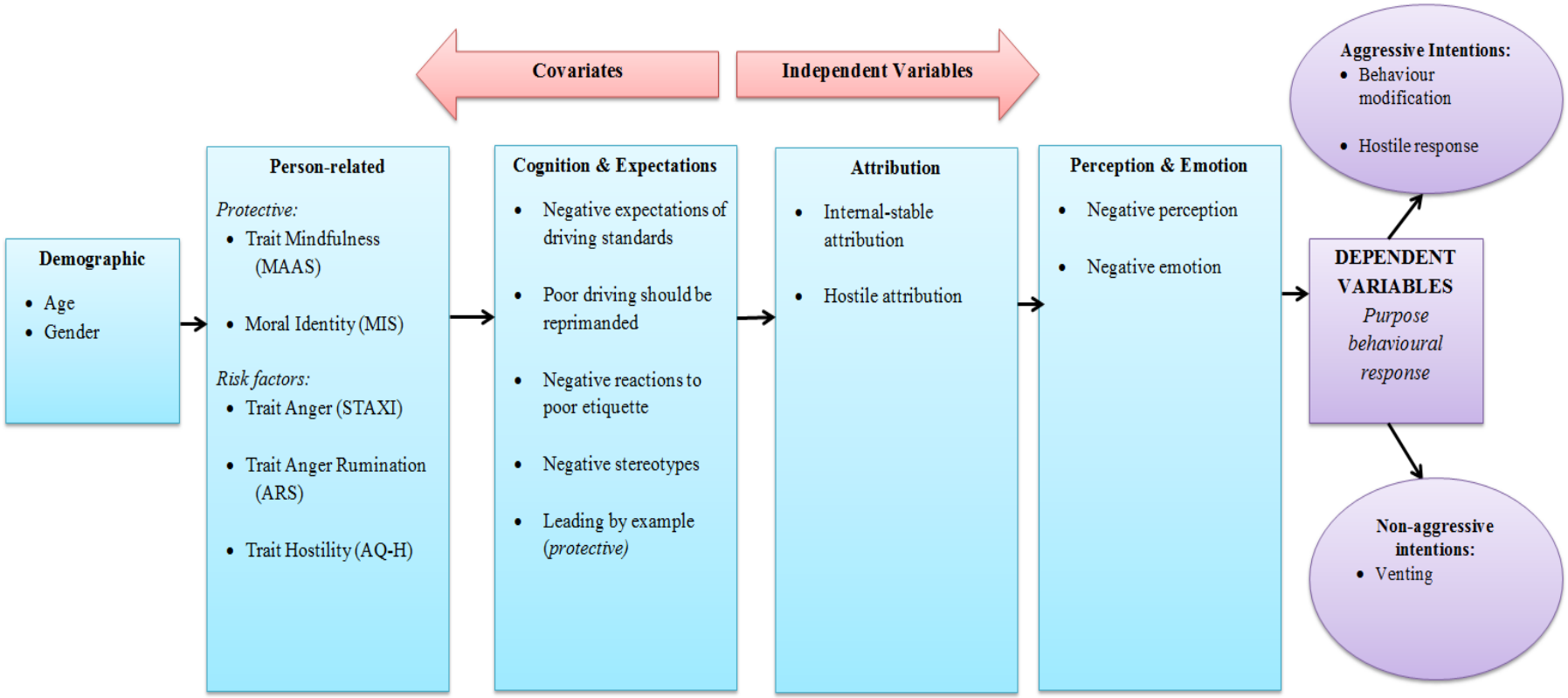

Figure 5.1. Diagrammatic representation of the approach to the analysis and the relationship between the variables and stage of the model.

5.3.4. Materials and measures

5.3.4.1. Stimulus materials

As described earlier, the current study utilised video vignettes depicting potentially provocative on-road events as the stimulus material. Participants were randomly assigned one of four vignettes, which will now be described.

5.3.4.1.1. Vignette 1: Being cut off when changing lanes. This event depicted the camera-equipped vehicle travelling in the left-hand lane of a double-lane road late in the afternoon. The vehicle is shown travelling at the posted 60 kilometres per hour (kph) speed limit while maintaining safe travelling distance from the vehicle in front. To the right of the vehicle, a silver Honda CRV can be seen travelling slightly ahead at a marginally higher speed, and edging closer to the vehicle in front of it. The Honda suddenly changes lanes to the left, moving in front of the camera vehicle. The indicator light begins flashing approximately half-way through the manoeuvre. The Honda then brakes suddenly once positioned in the left lane, apparently due to inadequate space.

5.3.4.1.2. Vignette 2: Being cut off at a merge. This vignette depicts the camera-equipped vehicle travelling on a two-lane road where it is clear from both the lane markings and a posted sign that the left-hand lane terminates up ahead, and vehicles will need to merge right. The road has a slight incline and the camera vehicle is behind a small truck that is travelling slightly under the speed limit of 60kph. With the exception of the truck directly in front, no other vehicles can be seen when the footage commences. After a short period of the camera-equipped vehicle following the truck at a reasonably safe travelling distance, the lane to the left begins to end. A silver Toyota Corolla hatchback appears very suddenly, speeding up the left-hand lane that is about to end, before proceeding to merge abruptly in between the camera vehicle and the truck in front. The driver of the Corolla is forced to slam on their brakes in order to fit between the camera vehicle and the truck.

5.3.4.1.3. Vignette 3: Blocked progress at traffic lights. This vignette begins with the camera-equipped vehicle stopped at a red light at an intersection behind a silver Mitsubishi Lancer. When the light changes to green, the Lancer fails to move, leaving the camera vehicle stuck behind. Several seconds pass before the Lancer notices that the light has changed and proceeds to accelerate at speed through the intersection. The camera-equipped vehicle proceeds through the intersection during the yellow phase of the signal.

5.3.4.1.4. Vignette 4: Impeded by a slow driver. This vignette shows the camera-equipped vehicle travelling on a major national highway with a speed limit of 110kph. There are many other vehicles on the road. The camera-equipped vehicle is travelling behind a white Ford station wagon which is travelling at a substantially lower speed than the rest of traffic (approximately 80kph, i.e., 30kph under the speed limit). Other vehicles can be seen both undertaking and overtaking the camera vehicle, leaving the camera vehicle with no opportunity to change lanes or overtake the slow driver.

5.3.3.2. Manipulation check

To ensure that participants viewed the video and to establish if they perceived the vignette in the way it was intended, participants were asked to provide a brief written description of what they believed had transpired in the video immediately after viewing it.

5.3.5. Independent variables: Person-related measures

Participants completed standardised measures of the trait characteristics identified in the preceding chapters as relevant to driver aggression: mindfulness, rumination, hostility, aggression and moral identity. The standardised measures assessing these constructs will now be described.

5.3.5.1. Trait mindfulness

Trait mindfulness was measured using the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS is a 15-item, single factor questionnaire measuring typical levels of awareness of the present moment. Participants indicate how often they experience the occurrence described in each item using a 6- point Likert scale (1= *almost always* to 6 = *almost never*). Higher scores reflect a greater disposition towards mindfulness. Example items include "*I rush through activities without being really attentive to them*" and "*I do jobs or tasks automatically, without being aware of what I'm doing.*" The MAAS has been found to correlate with measures of internal state awareness; a related construct captured in the GAM has demonstrated good test-retest reliability r =.79, and internal consistency ranges of α= .82-.87 (Borders et al., 2010; Brown & Ryan, 2003; Mackillop & Anderson, 2007).

5.3.5.2. Trait hostility

The hostility subscale of the Buss-Perry Aggression Questionnaire (AQ-H; Buss & Perry, 1992) was used to measure trait disposition towards negative and hostile cognitions that have the potential to fuel aggression. The hostility subscale is designed to capture the cognitive component of aggression, and measures people's thoughts of suspicion, injustices and hostile thought towards others. The AQ-H consists of eight items rated on a 5-point scale where 1= *very uncharacteristic of me* and 5= *extremely characteristic of me*, with higher scores reflecting greater levels of trait hostility. Example items include "*I am suspicious of overly friendly strangers"* and "*I wonder why sometimes I feel so bitter about things.*" The AQ-H has demonstrated good internal consistency, with alpha ranging between .77 and .82, and strong test-retest reliability (r = .70 to .83) (Buss & Perry, 1992; Harris, 1997).

5.3.5.3. Anger rumination

Dispositional anger rumination was measured using the Anger Rumination Scale (ARS; Sukhodolsky, Golub & Cromwell, 2001). The ARS contains 19 items assessing the cognitive processes that unfold after anger has been triggered. Participants were required to indicate how well each item corresponds to themselves using a 4-point Likert scale where 1= *almost never* and 4 = *almost always*, with higher scores reflecting a greater tendency towards anger rumination. Example items include "*After an argument is over, I keep fighting with that person in my mind*" and "*Memories of even minor annoyances bother me for a while*." The ARS has been found to have excellent internal consistency ($\alpha = 0.93$), a test-retest reliability coefficient of .77, and is correlated with measures of trait anger (r= .57) (Sukhodolsky et al., 2001).

5.3.5.4. Trait anger

Trait anger was measured using the trait scale of the State-Trait Anger Scale (STAXI-2; Spielberger et al., 1983a), which assesses individual differences in the frequency of anger experiences. It consists of ten items rated on a 4-point Likert scale where 1 = *almost never* and 4 = *almost always*. Higher scores reflect a greater disposition towards trait anger. Examples items include "*I am quick tempered"*" and "*When I get mad, I say nasty things.*" The trait scale of the STAXI-2 has been used successfully in studies examining driver aggression (e.g., Dula and Ballard, 2003; Zhang, 2016) and has demonstrated good internal consistency (α = .66 to .93) as well

as correlating with other measures of aggression and hostility (Spielberger, Johnson, Russel, & Crane, 1983b; Spielberger, Reheiser, & Sydeman, 1995).

5.3.5.5. Moral identity

In Chapter 3, a pattern was identified in the diary responses where some drivers appeared to refrain from an aggressive response, because they perceived that making one would demean them. As discussed in section 3.12.1.2, this way of conceptualising the choice not to respond may have links to moral identity; that is, how dominant or salient moral behaviour is to one's identity, and how strongly one expresses or demonstrates moral behaviour through one's actions. To explore this potential protective factor further in the current study, participants completed the 'Self-Importance of Moral-Identity' Scale (MIS; Aquino & Reed II, 2002a). The MIS is a 10 item scale, which was selected because it measures how important moral behaviour is to one's identity, and the extent to which one seeks to demonstrate one's moral character through one's actions (Aquino & Reed II, 2002a). Participants are presented with a list of adjectives describing characteristics associated with being a moral person (e.g., compassionate, kind, generous) and are asked to imagine how a person with these traits would think, feel, and behave. After imagining what a person with the listed traits would be like, participants respond to questionnaire items such as "*being someone who has these characteristics is an important part of who I am*" and "*the types of things I do in my spare time clearly identify me as having these characteristics.*" Items are rated on 7-point Likert scale where 1 = *strongly disagree* and 7 = *strongly agree*. The MIS has demonstrated adequate internal consistency and reliability, with alpha ranging between.77 and .83 (Aquino & Reed II, 2002b; Winterich et al., 2013b).

5.3.6. Independent variables: Cognitive factors

A number of variables reflecting cognitive constructs were examined in the current study. These are described below.

5.3.6.1. Driver cognitions and expectations

As described in section 5.2.3, the current study was directed toward examining how drivers' cognitions regarding the driving environment influence driver aggression through the expectations regarding driving behaviour they engender. In particular, the study focused on the role of some of the common

cognitions identified by the previous qualitative investigations that appear to influence driver aggression. These cognitions were summarised earlier in section 5.2.3.

A purpose built measure was constructed to examine these identified cognitions and their potential influence on driver aggression in greater depth. This measure had 21 items designed to reflect five factors, with and each factor was intended to measure one of the identified cognitions. Participants were presented with statements reflecting these cognitions, and were required to indicate the extent to which they agreed or disagreed with each statement on a 6-point scale where 1= '*strongly disagree*' and 6= '*strongly agree*'. Higher scores reflected greater agreement with the statement. Example items and the associated cognition are displayed in Table 5.2.

Table 5.2. Example items for the driver cognitions and expectations measure

Identified Cognition	Example item
Negative reactions to poor etiquette	*"I expect that motorists will show good manners on the road and feel annoyed when this expectation is not met."*
Thoughts about reprimanding poor driving	*"If someone's driving inconveniences, annoys, and/or angers me, I feel I should communicate this to them to make them aware."*
Poor driving standards	*"Bad driving is so common that it almost seems 'normal'."*
Negative stereotypes about other drivers	*"Drivers of 4WDs are bullies who use the size of their vehicle to intimidate others."*

5.3.6.2. Attribution and hostile attribution bias

Participant attributions regarding the cause of the event depicted in the video vignette were assessed using four statements, each declaring a potential cause of the event. Consistent with Weiner's (1986) original theory, these statements were designed to vary according to the key dimensions of stability and locus of control. For instance, the statement reflecting an internal-stable attribution emphasised inherent characteristics of the other driver shown in the video: "*it happened because that's just the way the driver is; their behaviour reflects the type of person they are."* Alternatively, the statement reflecting an external-unstable attribution emphasised mitigating circumstances: "*there must have been some sort of extenuating*

circumstances, like a passenger emergency happening that contributed to the driver's behaviour." Participants were asked to carefully consider what they believe would have been the most likely cause for the event shown in the video, and indicate the extent to which they agreed or disagreed with each statement (1 = *strongly disagree* 6 = *strongly agree*). The mean ratings for each of the four attribution items were examined in each triggering event condition, and the variable reflecting internal-stable attributions was included in the subsequent analysis (see section 5.4.5.3).

A further two statements were presented to examine the degree to which participants attributed hostile intention to the other driver's actions. These statements required participants to indicate the extent to which they agreed or disagreed that the driver's behaviour was deliberate and that it was intended to inconvenience or upset them, using a 4-point scale where 1 = *strongly disagree* and 4 = *strongly agree*. It was recognised that high scores in response to one item may not necessarily entail high scores on the others. For instance, some drivers may consider the behaviour deliberate but not necessarily intended to cause deliberate inconvenience them. Arguably, high scores on both items would reflect stronger hostile attribution. As such, the scores on each of the two hostile attribution bias measures were multiplied together to weight the relative contribution of each item towards the overall hostile attribution. The resultant score was then entered in the subsequent analyses to test hypotheses.

5.3.6.3. Negative emotion and perception

To assess if the event was perceived negatively and further, if it generated negative emotion, two measures were purpose-designed based on the findings from the previous qualitative studies regarding drivers' perceptions of the events they reported. First, to measure the extent to which the depicted event was perceived negatively, a list of 12 adjectives were provided and participants were asked to indicate the extent to which they believed each adjective described the event depicted using a 4-point scale where 1 = *not at all* and 4 = *a lot*. These adjectives were chosen because they were among the most common descriptions used by participants in the previous qualitative investigations to describe the events reported in the diaries and included terms such as "*inconsiderate",* "*rude*", and "*unaware*". A composite negative perception score was computed for each participant with responses for two

items ("*mistake*" and "*courteous*") reverse-scored. Higher scores on the composite measure reflected greater levels of negative perception.

Second, to assess likely emotional responses to the depicted event, participants were presented with a list of 16 words that were common used by participants in the qualitative studies to describe emotional reactions (e.g., "angry", "annoyed", and "outraged"). Participants were asked indicate the extent to which they believed that they would experience each emotion in response to the event, using the same 4-point scale as for the negative emotion measure. One item ("*satisfied*") was reverse scored and scores for each item were summed to form an aggregate negative emotion score, where higher scores reflected greater self-reported negative emotion.

5.3.7. Dependent variable: Purpose of behavioural response

Consistent with the definition of aggression used to guide the current research (see section 2.4.1), rather than focus on drivers' behavioural response to on-road events in isolation, driver aggression was operationalised in terms of the participants intentions to respond aggressively to a potentially provocative on-road driving situation.

To assess which behaviours may reflect aggressive intentions, participants responded to a set of three questions designed to establish the purpose of their likely behavioural response to the event depicted in the video vignette. A list of 18 possible behavioural responses was provided and participants were required to indicate their likelihood of engaging in each of them in response to the event on a 5-point scale where 1 = *very unlikely* and 5 = *very likely*. The list of possible behavioural responses included items such as "*take a deep breath and continue driving*", common aggressive behaviours such as "*honk your horn*", as well as "*follow the driver to confront them*." These items were drawn from the range of responses described by participants in the diaries and from other similar studies exploring driver aggression (Lennon et al., 2011; O'Brien, 2010). Following completion of these items, participants were required to state which of the listed responses they believed would be their most likely response to the event shown in the earlier video.

Finally, to assess the purpose of drivers' likely behavioural response, participants were required to indicate the extent to which they would want their response to achieve each of 12 stated outcomes. These items reflected the purpose of

behavioural responses described by participants in the previous qualitative studies. They included arguably non-aggressive intentions, where the purpose of the behaviour appears constructive (e.g., "*get yourself away from the driver*" and "*alert or warn the driver*"), and aggressive intentions, where the purpose the behaviour is to criticise (e.g., "*indicate that you don't approve of their behaviour*") or antagonise (e.g., "*inconvenience, or annoy the other driver*") the target driver. Participants rated each item on a 4-point scale where 1 = *not at all* and 4 = *a lot*. As will be described in section 5.3.9, an exploratory principal components analysis was performed on these items to explore different purposes for behavioural responses, and the resulting three factors from this analysis were used as dependent variables in subsequent analyses.

5.3.8. Procedure

Ethical clearance was gained from QUT's Human Research Ethics Committee (Approval Number 1300000835). Prospective participants were required to register their interest in the research by providing their email address, age and gender, as well as specifying the Australian state in which they reside. This was done for two key reasons: firstly, to ensure that all participants met the eligibility criteria of living in Queensland, and secondly, to allow the researcher to assign participants to a stimulus condition. To assign a condition to participants, each of the four conditions was numbered one to four. Numbers were placed into a hat, with one drawn out at random to determine which condition the first participant would be assigned. Following assignment of the first condition, each subsequent eligible participant was assigned the next condition in numerical order, starting back at the initial condition once four people had been assigned conditions. Once participants were assigned a condition, they were emailed a link to the survey containing the appropriate video. Before commencing the materials, participants were required to check a box indicating that they had read and understood all information provided to them about the study.

The first set of materials presented was the battery of demographic and person-related measures. Accompanying instructions for all person-related measures emphasised that the questions were not specific to driving and had no right or wrong answer. The instructions also encouraged participants to select the response they feel best described their experiences most of the time. After completion of all person-related measures, participants were presented with the driving event stimulus.

Instructions that supplemented each video informed participants that they could view the video as many times as needed in order to ensure they had an understanding of what was being presented in the video, but they would not be able to return to it once they had moved to the next page. A brief description regarding the general circumstances surrounding the events depicted in the video was provided to contextualise the situation. These descriptions explained the time of day that the event occurred, the type of road that it occurred on (e.g., major national highway, suburban road), the posted speed limit, and general traffic conditions. All instructions emphasised that the driver of the camera vehicle was adhering to all road rules in the depicted situation.

After the video, participants completed the manipulation check, followed by the items assessing cognitions, behavioural response, and purpose of response. The questionnaire concluded with the driver cognitions and expectations measure, which emphasised to participants that the questions were general and were not specific to the events shown in the video. While it is acknowledged that responses the driver cognition and expectations measure may have been biased, or primed by viewing the driving event stimulus and responding to the subsequent questionnaire items about this event. However, the decision was made to present the driver cognitions and expectations measure after, rather than before the stimulus materials, to avoid biasing responses to the questionnaire items that were assessing thoughts about, and responses to, the stimulus material.

The questionnaire was piloted with a small sample of acquaintances and colleagues. The questionnaire took approximately 30 minutes to complete and all participants, with the exception of undergraduate students participating in exchange for course credit, were offered a $20 gift voucher to thank them for their time. Upon completion of the questionnaire, participants were redirected to a separate website where they were able to register their details in order to have their gift voucher mailed out to them, thus protecting participant anonymity and confidentiality.

5.3.9. Statistical Analyses

As described above, most of the measures in the current study utilised Likert-type response options, and response scores were treated as continuous, to allow for the use of the parametric tests described below. In all analyses, a significance level of $\alpha = .05$ was adopted, unless otherwise stated.

Exploratory Principal Components Analysis (PCA) was performed on the items comprising the driver cognitions and expectations measure scale to ensure they reflected the underlying constructs they are were designed to assess. Exploratory PCA was also conducted on the items assessing the underlying purpose of participants' likely behavioural responses in order to determine factors that may reflect underlying aggressive intentions. To facilitate a thorough investigation of the model, it was considered necessary to explore factors that influence aggressive intentions as well as factors that influence non-aggressive intentions. Accordingly, exploratory PCA was conducted to explore different purposes of behavioural responses, and the factors that emerged were treated as dependent variables in a subsequent exploration of the model.

Given that multiple dependent variables were being explored, and the independent variables included categorical (gender) and continuous variables, a Multivariate Analysis of Covariance (MANCOVA) was carried out to explore the effect of these independent variables on the purpose of behavioural responses to on-road events (Field, 2013). MANCOVA and regression bear many conceptual similarities (see Kiebel & Holmes, 2003; Tabachnick & Fidell, 2007), and as such, MANCOVA was able to examine the combined effect of the independent variables, allowing for the overall effectiveness of each model to be established. In addition, MANCOVA controls for the effect of all other independent variables in the model. Thus the analysis permits the determination of the unique effect of the independent variables on multiple dependent variables, thus allowing for the unique contribution of each independent variable on purpose of response to be established. In accordance with recommendations by Tabachnick and Fidell (2007), Roy's Largest Root is reported as the multivariate test statistic, and univariate tests are used to follow up where omnibus multivariate tests are significant. Beta-weights are inspected to determine the nature of the effect (positive or negative).

One-Way Analysis of Variance (ANOVA) was used to explore differences in the independent variables across the different video vignette conditions. Levene's test for equality of variances was inspected to determine whether the assumption of homogeneity of variance was met. In instances where this assumption was met, the statistics assuming equal variance were interpreted and reported. Where Levene's test was significant, thus indicating unequal variances, the statistics not assuming equal variance are reported. Given that most hypotheses specify the expected nature of the difference between the conditions, planned comparisons are used to compare

differences between groups in instances where the omnibus test is statistically significant. Bonferroni post-hoc tests were conducted to make adjustments for family-wise error in instances where there are multiple comparisons.

Relationships between continuous variables were explored at the bivariate level using Pearson's product moment correlations (*r*). Interpretations regarding the strength of correlation coefficients are made based on Cohen's conventions of *r* = .10 as a small or weak effect, *r* = .30 as a moderate effect, and *r* = .50 as a strong effect (Cohen, 1988).Sample size was determined using a G-Power, a readily available software download that allows for statistical power and sample size to be easily calculated. G-Power allows the user to set the desired test statistic, method of analysis, effect size, and power level. Because the MANCOVA analysis was used to conduct a preliminary investigation of the model, and because MANCOVA and regression are both general linear models (Field, 2013; Stevens, 2012), the G-Power analysis to determine the appropriate sample size was based on the requirements for multiple regression (MANCOVA is not listed as an analysis option for an *F* test). This analysis revealed that for a total of 19 variables, with power set to .95 and alpha set to .05, a minimum sample size of 204 was required to detect a medium effect size based on Cohen's conventions (R^2 = .13; Field, 2013). Based on this analysis, the study aimed for a minimum of 100 participants per video vignette condition, resulting in a target final sample size of 400 participants.

5.4. Results

5.4.1. Data cleaning and inspection

Data were downloaded from the Key Survey software used to host the questionnaire and imported into the Statistical Package for the Social Sciences (SPSS) Version 22. Prior to analyses, data were inspected to determine accuracy, identify missing values and outliers, and check assumptions. All variables were examined using SPSS Frequencies to ensure values were within the specified range, and a Missing Values Analysis was conducted. With the exception of mindfulness, which was missing approximately 7% of data, all remaining variables were missing less than five percent of data. Nevertheless, Little's MCAR test was significant ($\chi 2$ = 1127.069, *df* = 1019, p = .010), suggesting that data were not missing completely at random (Little, 1988). Where data is not missing at random, Tabachnick and Fidell (2007) recommend multiple imputation, a strategy where a pooled estimate of the

missing values is taken, based on a series of regression analyses performed on the available data. Missing data were imputed using this technique, and analyses were run using both the imputed and original data with the missing values. These analyses revealed no discernible differences in the results. Therefore, to preserve the integrity of the data, the original data rather than the imputed data were used for all subsequent analyses.

As suggested by Field (2013), data were inspected for multicollinearity using simple bivariate correlations, with correlations greater than .80 considered an indication of multicollinearity. No correlations greater than r = .648 were identified. Visual inspection of histograms conducted in conjunction with inspection of skewness and kurtosis statistics revealed that all data were within acceptable ranges, indicating normality.

Fourteen univariate outliers were identified using both visual inspection of histograms and standardised scores using the cut of $Z = > 3.29$ (Tabachnick & Fidell, 2007). Nine outliers were on the hostile attribution variable, two on the total negative emotion variable, and three on a factor of the driver cognitions and expectations measure. Although there is the potential for outliers to exert an undue influence on the results, given the nature of the research and the theorised links between these variables and aggressive behaviour, it was expected that outliers may be present. As such, all outliers were retained. No multivariate outliers were identified using Mahalanobis distance $\chi^2 (18) = 42.312$ (Tabachnick & Fidell, 2007).

5.4.2. Manipulation check

Participants provided their own individual accounts of the event depicted in the video, in order for the researcher to determine if they perceived the event in the intended manner. An accurate perception of the events depicted in the video was considered to be important, because responses to the subsequent questions regarding internal thoughts about the event would not be meaningful if participants believed they had seen a vastly different event to what the video intended to show. Accordingly, participants whose descriptions of the event and what they believed had occurred did not match the intended depiction were excluded from analyses.

To determine whether the event was perceived accurately, descriptions of each event were read by the researcher and assigned a ‘1’ if the general description mirrored the event being depicted and a ‘0’ if the description was ambiguous or

different. To help establish if a response could be regarded as having perceived the event accurately, the researcher looked for responses where the participant offered a tangible description of the event shown rather than general thoughts about the event or attributions for it. For instance, the example provided in Table 5.3 was an example of a response considered to be an accurate perception of cutting off by a driver changing lanes, demonstrating that the participant is likely to have paid attention to the video. In contrast, the example response considered to be inaccurate provides an attribution instead of a description. While it is acknowledged that this response may accurately describe perceptions of the event (being cut off), it does not offer any indication that the participant has identified the events in the video vignette. Furthermore, when reviewing responses that did offer tangible descriptions of an event, the researcher looked for responses that described the intended event. For instance, the provided example of a response considered to be an accurate perception of being held up by a slow driver states that the car in front is travelling below the speed limit. On the other hand, the provided example of a response considered to be an inaccurate perception describes a regular driving situation, which is not what the vignette intended to depict.

As Table 5.3 shows, the majority of participants assigned to the slow driver vignette condition do not appear to have perceived the situation accurately. Specifically, their descriptions of these events indicated that some participants believed the situation was a normal driving situation where nothing unusual was happening. Other participants indicated that they could not determine if the slow driver was, in fact, driving slowly or if other motorists were speeding. Finally, other participants thought that the footage depicted overtaking issues involving motorists driving in the right-hand lane without overtaking (a behaviour that is illegal where the speed limit is greater than 80 kph per hour) or drivers undertaking on the left-hand side. Due to the high level of discrepancy in the way participants perceived the event in the slow driver vignette condition, all responses to this condition were excluded from all further analyses. A series of independent samples *t*-tests verified that there were no significant differences on cognitive, person-related or demographic variables between participants who gave accurate descriptions of the events depicted in this particular vignette and those who did not. Reasons for the apparent ambiguity of the slow driver vignette are discussed in section 5.5.4.

Table 5.3. Examples of responses considered to be perceived accurately versus perceived inaccurately

	Perceived Accurately (*n*)	Example description	Perceived Inaccurately (*n*)	Example description
Cut off when changing lanes.	96	*"The Suzuki 4WD sped up a little to cut in front of the camera vehicle and then due to the short amount of space available had to brake and slow down, effectively causing the camera vehicle to slow down also."*	14	*"A typical inconsiderate driver that has no consideration for other drivers. He/she expects other drivers to make adjustments to accommodate them."*
Cut off at a merge.	87	*"The car with the camera was driving along, when a car in the left merging lane appeared to speed up to get in front of the car when the lane ended."*	20	*"I don't see anything wrong here, the lane was closing so car had to go into lane."*
Held up by failure to move at traffic lights.	96	*"The car at the lights in front of the camera car took about 6 seconds after the light had turned green to get moving."*	10	*"Too fast, inattentiveness to traffic lights and surroundings."*
Held up by a slow driver.	36	*"A car in front of me is doing less than the speed limit."*	71	*"A normal situation driving on the motorway, everyone is the correct speed, no accidents, no traffic jams: happy days."*

5.4.3. Principal Components Analyses

5.4.3.1. Driver cognition and expectations

An exploratory Principal Components analysis (PCA) with oblique promax rotation was conducted on the 21 items developed to assess the identified driver cognitions and expectations. An oblique promax rotation was chosen over an orthogonal rotation following Field's (2013) recommendations, which suggest that this is best suited where a relationship or correlation between the factors is expected. In this instance, it is expected that the factors would not be independent, and there would be a relationship between them, given that psychological measures have been found to be related (Cronbach & Meehl, 1955; Field, 2013).

Inspection of the Kaiser-Meyer-Olkin statistic (KMO = .839) confirmed the adequacy of the sample for further analyses (Williams, Brown, & Onsman, 2012). To determine the appropriate significance of factor loadings to assist in interpreting their importance, Field (2013) recommends a cut-off for factor loading greater than or equal to .3 However, Stevens (2012) suggests that this rule is outdated and arbitrary, and proposes that sample size needs to be taken into consideration for a more robust

interpretation. Following Stevens's recommendation, for a sample of 390, a critical factor loading of .258 would be required. Because this loading is quite low, and is not far from Field's suggested .30, a cut-off factor loading of .30 was set for this analysis.

As advised by Beavers et al. (2013) multiple criterion were inspected to determine the number of factors retained: Kaiser's criterion was adopted, the scree plot was inspected and a parallel analysis was conducted. First, the most commonly used method of determining the number of factors to retain, Kaiser's criterion suggests that factors should be retained if their eigenvalues are greater than 1. Based on this criteria, a five-factor solution was obtained with the initial results revealing five eigenvalues greater than 1 and which explained 64% of the variance. The rotated solution also revealed 5 eigenvalues greater than 1. However, inspection of the scree plot (see Appendix D) indicated that the inflection point appeared to suggest a three-factor solution. To further explore this, a parallel analysis was conducted and consistent with the Kaiser criterion, five factors were found to have raw data values greater than the comparison 95th percentile parallel analysis (Ledesma & Valero-Mora, 2007). As such, a five-factor solution was retained. Table 5.4 displays the factor loadings for each item and the labels given to each of the factors. It should be noted that no cross-loadings between the resultant factors were found.

As Table 5.4 shows, the three items assessing drivers' expectations for poor driving behaviour had quite high loadings on the same factor. Accordingly, the factor was labelled "negative expectations of driving standards". Furthermore, the three items designed to reflect stereotypes about other drivers loaded on to the same factor, which was labelled "stereotyping of other drivers", albeit these items had noticeably lower factor loadings than items on the other measures.

Some interesting patterns were revealed for loadings relating to the items assessing cognitions about driver etiquette, reprimanding poor driving, and satisfaction from not responding. Firstly, the three items assessing thoughts about the inappropriateness of other drivers behaviour included two items assessing general beliefs about how appropriate it is to criticise bad driving (e.g., *"drivers who do the wrong thing on the road should be called out on their poor behaviour"*), while one item referred to behaviour, and acting on that belief (e.g., *"if someone's driving inconveniences, annoys and/or angers me, I feel I should communicate this to make them aware."*) This item had the lowest loading (.431, compared to .839 and .707 for the remaining two items). As such, the factor was labelled "poor driving should be

reprimanded" to reflect the highest loadings. Similarly, the items assessing thoughts about driver etiquette all loaded onto the same factor, with items including statements regarding expectations for appropriate etiquette as well as emotional responses to etiquette violations. The items assessing emotional responses had higher loadings (.810 and .821) than the remaining four items, thus the factor was labelled "negative reactions to poor etiquette." Finally, of the items designed to assess the pattern of diary responses labelled "satisfaction and superiority", the item reflecting moral judgment or denigration of another driver's behaviour (e.g., "*responding out of anger or frustration to another driver's poor behaviour would make me just as bad as they are")* had a lower loading (.403) compared to the other items loading on that factor. As such, the factor was labelled "leading by example" to reflect that the items with the highest loadings described displaying courteous behaviour.

Inspection of the factor correlation matrix revealed weak to moderate correlations between the factors, ranging from r = -.020 to r = .545. Aggregate scores for each of the factors were calculated by summing participant responses to the items comprising each factor. Means, standard deviations, and Cronbach's alphas for each resultant factor are detailed in section 5.4.4.

Table 5.4. Exploratory PCA of the driver cognitions and expectations measure

Item	Rotated factor loading				
	Negative expectations of driving standards	Poor driving should be reprimanded	Negative reactions to poor driver etiquette	Stereotyping of other drivers	Leading by example
"I seem to encounter the same types of poor driving behaviour most times I drive."	.806				
"I take to the road knowing that I will encounter bad driving."	.771				
"Bad driving is so common that it almost seems 'normal'."	.841				
"Drivers who do the wrong thing on the road should be called out on their poor behaviour."		.839			
"Those who do foolish things on the road should be made aware of the impact they are having on others."		.707			
"If someone's driving inconveniences, annoys and/or angers me, I feel I should communicate this to make them aware."		.431			
"Drivers should always be alert to, and aware of how their behaviour is affecting others."			.387		
"I show consideration to other drivers, and expect they will be considerate in return."			.569		
"Rude and inconsiderate driving is frustrating, and can make me feel angry or upset."			.810		
"I expect that motorists will show good manners on the road, and can feel annoyed when this expectation is not met."			.821		
"It is the height of inconsideration to deliberately cause inconvenience to another motorist."			.554		
*"I'm not really thinking much about other driver's needs when I drive, I'm only really concerned with getting to where I need to go."**			.334		
"Drivers of 4WD's are bullies, who use the size of their vehicle to intimidate other drivers."				.565	
"Elderly drivers are so overcautious when they drive, they actually end up creating a safety hazard."				.491	
"'P-Platers' and young drivers behave recklessly when they drive, and seem to think they are invincible, even though their behaviour is dangerous."				.539	
"I pride myself on being a more considerate and civil driver than most others."					.635
"Responding out of anger or frustration to another driver's poor behaviour would make me just as bad as they are."					.403
"I feel proud that I obey the road rules when most drivers' these days seem to disregard them."					.665
"The fact that I am a polite and courteous driver is clearly communicated to other motorists by the way I drive."					.840
"The way I drive shows others that I am a well-mannered driver."					.937
"I lead by example in making sure that the way I drive reflects the level of consideration and courtesy that people should display on the road."					.850
Eigenvalues	1.93	1.52	3.31	1.10	5.64
% of variance	9.20	7.21	15.34	5.20	26.87

*Reverse scored

5.4.3.2. Purpose of behavioural response

Similarly, exploratory PCA with oblique promax rotation was also used to explore different dimensions of the intentions underlying the items assessing the purpose of participants' likely behavioural response. The Kaiser-Meyer-Olkin measure revealed that the sample was adequate to facilitate further analyses (KMO = .836), and following recommendations by Stevens (2012), a critical cut-off value of factor loadings greater than or equal to .384 was set. It must be noted that this cut-off is different from the one used in the above factor analysis, due to differences in sample size. Specifically, because responses to the items being examined in the current analysis were dependent on perceptions of the event shown in the vignette, participants who failed the manipulation check and participants assigned to the slow driver vignette were excluded from the analysis. In contrast, responses to the items comprising the driver cognition and expectation measure were not dependent on perceptions of the event in the vignette, and thus the entire sample was included in the analysis.

Similar to the PCA conducted for the driver cognitions and expectations items, Kaiser's criterion, inspection of the scree plot and a parallel analysis were all conducted to determine the appropriate number of factors to retain. All of these criterion revealed a three-factor solution in both the initial and rotated results, accounting for 60% of the variance (please refer to Appendix D for the scree plot). Accordingly, a three-factor solution was retained, and Table 5.5 displays the factor loadings for each item and the labels given to each of the factors. With factor loading less than .384 suppressed, no cross-loadings were evident. As Table 5.5 shows, the six items reflecting driver responses described as "teaching them a lesson" in previous chapters (i.e., using the behavioural response to criticise and communicate disapproval with an apparent view to modify the target driver's behaviour) all loaded onto the one factor. It is notable that the items with the two highest loadings ("*encourage the driver to reconsider or think about their driving behaviour* and *'indicate to the driver they need to amend their driving immediately"*) make direct reference to the target driver changing their behaviour, and as such, this factor was labelled 'behaviour modification' to reflect the apparent intention that criticising the behaviour would provide the impetus to improve their driving behaviour.

The second factor was labelled "venting" as the two items loading onto this factor described the purpose of the likely behavioural response as voicing the driver's thoughts about the situation without directly expressing them to the other driver or

communicating any message to them. Finally, the two items describing the purpose of the likely behavioural response as antagonising or intimidating the offending driver loaded onto the same factor. Thus this factor was labelled 'hostile response', to reflect the apparent intention of creating a nuisance for the target driver. Interestingly, factor loadings for the two items designed to reflect the purpose of behavioural response as removing oneself from the situation fell below the critical cut-off value of .384.

A number of considerations must be made with regards to these results. First, it must be noted that only two items loaded onto the hostile response and venting factors yet a minimum of three items are required to form a factor (Osborne & Costello, 2009). Unfortunately, this issue was unavoidable and all attempted solutions revealed similar solutions. Because time and budgetary constraints did not permit the study to be re-run with more items, it was decided to proceed with the two item solution despite it not being ideal and therefore associated with limitations (which will be addressed in the discussion in sections 5.5.4 and 6.4). In the interest of brevity, the decision was made, however, to use the term 'factor' throughout the remainder of the thesis when referring to these constructs. This term is used with acknowledgement that, strictly speaking, they are not factors and, therefore, findings need to be interpreted with caution.

Second, consistent with the definition of driver aggression adopted in the program of research, only two of the three resulting factors representing purpose of behaviour can be regarded as reflecting aggressive intentions. Specifically, the "behavioural modification" and "hostile response" factors are regarded aggressive, as they both appear to be intended to cause some degree of psychological harm. While the intention to cause psychological harm is explicitly obvious where the purpose of behaviour is to annoy, cause nuisance to, or even intimidate the target driver, drivers whose purpose is to criticise are arguably likely to anticipate that the aggressively delivered negative criticism will be unpleasant enough to prompt the target motorist to improve their driving. Alternatively, descriptions of venting simply describe wishing to release the negative feelings without directing them at the other driver. As such, the "venting" factor is not considered to reflect underlying aggressive intentions according to the adopted definition.

As would be expected, inspection of the factor correlation matrix revealed moderate correlations between the three factors, ranging from $r = .359$ to $r = .540$, indicating that multicollinearity between these factors was not present. Aggregate

scores for each of the factors were calculated by summing participant responses to the items comprising each factor. Inspection of descriptive statistics highlighted that there was a high number of lower scores occurring for the hostile response factor, resulting in a leptokurtic distribution, with kurtosis exceeding acceptable levels for normality assumptions (K = 11.16). As it was intended to use this as a dependent variable in a MANCOVA analysis (where normality is an assumption), a reciprocal transformation, which is effective in dealing with positive kurtosis, was conducted on these scores (Field, 2013). This transformation was successful in bringing kurtosis down to acceptable levels for assumptions of normality to be met (K = 2.28). Analyses were run using both transformed and untransformed data, with noticeable differences between the two. As such, the results of inferential statistics used to test hypotheses report the transformed results.

Table 5.5. Exploratory PCA of items assessing purpose of likely response to provocative events.

	Rotated factor loading		
Item	Behaviour modification	Venting	Hostile response
"Indicate to the other driver that you don't approve of their behaviour."	.630		
"Alert, or warn the other driver to a dangerous situation."	.623		
"Communicate your thoughts on the situation to the driver."	.754		
"Indicate to the driver they need to amend their driving immediately."	.877		
"Encourage the other driver to reconsider or think about their driving behaviour."	.915		
"Send the driver a message concerning their poor driving behaviour."	.790		
"Vent your own feelings."		.964	
"Express your feelings."		.890	
"Threaten or intimidate the other driver."			.752
"Inconvenience or annoy the other driver."			.945
"Get yourself away from the driver."			
"Help you get to your destination faster."			
Eigenvalue	4.91	1.25	1.08
% of variance	40.94	10.38	9.02

5.4.4. Descriptive statistics and reliability

The following sections document descriptive statistics for all measures used in subsequent hypothesis testing. Where appropriate, they also describe the results of independent means *t*-test to examine gender differences and ANOVA's to ensure that random allocation to conditions resulted in groups of participants that were demographically, statistically similar.

Cronbach's alphas for the person-related measures and cognition factors are provided in Table 5.6. While Cronbach's alpha for most person-related factors demonstrated excellent reliability, two key issues were identified. Firstly, conducting the item analysis revealed that three items were missing from the Anger Rumination Scale, leaving 16 items rather than the original 19 items. As will be described in section 5.5.4, the unintentional omission of these items is believed to be due to a technical issue with the Key Survey software program used to host the online survey. However, given that anger rumination was identified as potentially having a strong influence on aggression and is under-investigated in the driving context, and the value of the Cronbach's alpha was very high for the remaining 16 items ($\alpha = .936$), the decision was made to retain the Anger Rumination Scale scores in all analyses. A discussion of the limitations resulting from the absence of three items is provided in section 5.5.4.

Secondly, item analysis revealed lower than desired reliability for the stereotyping factor of the driver cognition and expectation measure $\alpha = .60$. There is considerable debate within the scientific community regarding acceptable levels of reliability (Peterson, 1994). While many perspectives (e.g., Kaplan & Saccuzzo, 2012; Nunnally, Bernstein, & Berge, 1967) consider alpha coefficients greater than .70 as indicative of good reliability, other perspectives (e.g., Murphy & Davidshofer, 1988) suggest that coefficients equalling .60 or lower are unacceptable, particularly for preliminary research. Moreover, Tabachnick and Fidell (2007) state that there is an increased risk of both Type I and Type II errors if unreliable covariates are used in a MANCOVA. Thus although the Cronbach's alpha of this factor may be regarded as acceptable using some of the suggested criteria, when the lower factor loadings for the items comprising this factor, and Tabachnick and Fidell's recommendations were taken into account, it was decided that the reliability was too questionable to include the factor in further analyses; it was thus excluded.

Table 5. 6. Cronbach's Alpha's (α) for independent and dependent variables.

Stage of model	Variable	α
Person-related factors	Mindfulness	.91
	Hostility	.88
	Anger Rumination	.94
	Anger	.87
	Moral Identity	.85
Cognitive factors	**Driver cognition and expectation**	
	Expecting poor standards	.86
	Reprimanding poor driving	.78
	Reactions to poor driver etiquette	.73
	Stereotyping of other drivers	.60
	Leading by good example	.85
	Perception and emotion	
	Total negative perception	.84
	Total negative emotion	.86
Purpose of behavioural response	Behaviour modification	.91
	Venting	.90
	Hostile response	.84

Means and standard deviations as well as minimum and maximum scores for all measures broken down by gender are displayed in Table 5.7. Inspection of scores for person-related measures revealed that females had higher mean scores than males on all measures except mindfulness. Independent means *t*-tests revealed significant gender differences for scores on mindfulness ($t = 3.51$, $p = .001$) and moral identity ($t = 3.93$, $p = .001$) such that males scored significantly higher on mindfulness and females scored significantly higher on moral identity.

Descriptive statistics for scores on the driver cognition and expectation factors demonstrated slightly higher means for men on all factors, except the leading by example factor, where females scored marginally higher. Furthermore, females also reported stronger endorsement of external attributions than men, perceived greater hostile intentions from the target driver, and reported greater levels of negative emotion and perception. Nevertheless, none of these differences were found to be statistically significant. Additionally, means and standard deviations for factors forming the dependent variables revealed no significant gender differences.

A series of one-way ANOVAs revealed no significant differences in scores on the person-related measures and the driver cognition and expectation factors between the three driving event conditions.

Table 5.7. Means and standard deviations for variables, broken down by gender

				Total Sample (*N* = 279)		Males (*n*=117)		Females (*n* =162)	
Stage of model	Variable	Min	Max	*M*	*SD*	*M*	*SD*	*M*	*SD*
Person-related factors	Mindfulness**	20	89	62.10	13.24	64.73	12.91	60.07	13.16
	Hostility	8	40	18.00	6.82	17.66	6.57	18.21	7.01
	Anger Rumination	16	64	32.54	10.23	31.89	10.66	33.06	9.86
	Anger	10	40	19.95	5.97	19.51	5.89	20.31	6.03
	Moral Identity **	28	66	50.17	7.66	48.52	7.45	51.48	7.58
Cognitive factors	***Driver cognition and expectation***								
	Expecting poor standards	4	18	12.40	3.34	12.92	3.20	12.03	3.40
	Reprimanding poor driving	3	18	12.15	2.96	12.51	2.75	11.89	3.09
	Reactions to poor driver etiquette	13	36	28.20	4.32	28.41	4.50	28.05	4.21
	Leading by good example	12	36	26.55	4.91	26.01	4.93	26.95	4.88
	Causal attribution								
	External-Stable	1	6	2.37	1.25	2.25	1.29	2.46	1.22
	Internal-Unstable	1	6	3.27	1.36	3.37	1.32	3.20	1.39
	Internal-Stable	1	6	3.74	1.26	3.77	1.26	3.73	1.26
	External-Unstable	1	6	2.93	1.25	2.88	1.26	2.97	1.24
	Hostile attribution	1	16	4.62	2.91	4.38	2.50	4.79	3.18
	Perception and emotion								
	Total negative perception	17	48	33.45	7.19	32.93	6.91	33.81	7.40
	Total negative emotion	17	59	30.58	7.42	30.50	7.54	30.64	7.35
Purpose of behavioural response	***Purpose***								
	Behaviour modification	6	24	12.34	5.31	12.50	5.65	12.22	5.10
	Venting	2	8	4.49	2.04	4.35	1.96	4.59	2.10
	Hostile response	.13	.50	.46	.09	.45	.09	.46	.09

** p = <.001 *p = <.05

5.4.5. Hypothesis testing

The following sections describe the results of the analyses that were conducted to test the hypotheses guiding the current research. As described in section 5.3.9, bivariate correlations were used to explore relationships between continuous variables, and thus address hypotheses 10-13. A one-way ANOVA was used to

explore differences in the perception and attribution of the events depicted in each vignette condition, thus addressing hypotheses 1, 2 and 7. Hypotheses 3-9 and hypothesis 14 were explored using MANCOVA. These hypotheses were intended to explore the effect of each component of the model on the purpose of behavioural response and to determine the overall efficacy of the proposed model.

5.4.5.1. Bivariate correlations

Correlation analyses at the bivariate level were conducted to explore the relationships between the person-related factors being explored in the current study. Results are displayed in Table 5.8 and reveal significant correlations between all measures, with the exception of moral identity. Consistent with the theorised relationships, mindfulness displayed a moderate negative relationship with anger (r = -.46), anger rumination (r = -.49) and hostility (r = -.39). Furthermore, moderate to strong positive relationships were found between anger, anger rumination, and hostility, with the largest coefficient found between hostility and anger rumination (r = .63), suggesting that those with a stronger hostile disposition also have a greater tendency to ruminate over anger experiences.

Table 5.8. Bivariate correlations between scores on person-related measures.

	Mindfulness	Hostility	Anger Rumination	Anger	Moral Identity
Mindfulness	1				
Hostility	-.39**	1			
Anger Rumination	-.49**	.66**	1		
Anger	-.46**	.59**	.61**	1	
Moral Identity	.00	-.01	-.08	-.07	1

** p = <.001.

Analyses were then conducted to explore relationships between scores on all cognition-related variables. Correlations were first inspected by driving event condition to determine if there were differences in the strength of the correlations based on the condition. This was done because the attribution and perception items assessed responses to the event shown in each condition, while the driver cognition and expectations measure was not specific to each condition. However, no discernible differences between these correlations in each condition and the aggregate correlations were apparent. As such, in the interest of parsimony, the

overall correlations are displayed in Table 5.9, showing several significant relationships.

Table 5.9. Bivariate correlations between scores on person-related measures.

	Negative expectation	Poor driving should be reprimanded	Reactions to poor etiquette	Leading by example	Internal- Stable attribution	Hostile attribution	Negative perception	Negative emotion
Negative expectations	1							
Poor driving should be reprimanded	**.49****	1						
Reactions to poor etiquette	.25**	**.58****	1					
Leading by example	.13*	.16	.31**	1				
Internal Stable attribution	.29**	.31**	.17**	.13*	1			
Hostile attribution	.24**	**.41****	.24**	.17*	**.48****	1		
Negative perception	.33**	**.42****	.36**	.23*	**.53****	**.62****	1	
Negative emotion	.30**	**.49****	.38**	.07	.33**	.33**	**.55****	1

** p = <.001; *p = <.05. Bolded correlations highlight the larger correlation coefficients, greater than r = .40

Correlations between scores on each factor of the driver cognitions and expectations measure revealed a moderate positive correlation between the reprimanding and reactions to poor etiquette factors (r = .58 p = <.001), suggesting that those who experience greater negative reactions to perceived poor driver etiquette also believe more strongly that poor driving should be reprimanded. In addition, moderate correlations were found between the poor driving should be reprimanded factor and internal-stable attribution scores (r = .31, p = <.001), negative perception (r = .42, p = <.001), negative emotions (r = .49, p = <.001) and hostile attribution (r = .41, p = <.001). These correlations suggest that those drivers who believe that poor driving should be reprimanded also have more negative, hostile thoughts about potentially provocative on-road events.

A relationship of moderate strength was found between the internal-stable attribution variable and the hostile attribution variable (r = .48, p = <.001). This suggests that those who attributed the event to dispositional characteristics of the offending driver also perceived the others' behaviour as having hostile intentions. Finally, moderately strong positive correlations were found between scores reflecting the level of negative perception and strength of internal-stable attributions (r = .53, p =<.001), and strength of hostile attribution (r = .62, p = <.001), with the relationship between hostile attribution and negative perception being the largest coefficient observed.

In addition, correlations to explore relationships between the person-related measures and the cognition variables are displayed in Table 5.10. Weak to moderate correlations were found between person-related measures hypothesised to increase driver aggression and most of the factors forming the driver cognitions and expectations measure, as well as negative emotion. Notably, trait hostility was moderately correlated with negative emotion (r = .34) and the reprimanding factor (r = .29). Trait anger rumination was also moderately correlated with negative emotion (r= .46) and the reprimanding factor (r = .39), as was trait anger ($r_{\text{negative emotion}}$= .32; $r_{\text{reprimand}}$ = .32). These results suggest that drivers with higher scores on the person-related measures thought to increase driver aggression experience greater negative emotion to on-road provocations, and they agree more strongly that poor driving should be reprimanded.

Consistent with the proposed relationship, a moderate positive correlation (r = .36) was found between the moral identity factor and the leading by good example

factor of the driver cognitions and expectations measure, suggesting that those who indicated stronger agreement with items that described displaying appropriate manners in their own driving behaviour also identified more strongly with being a moral person. Higher scores on moral identity were also positively, albeit weakly, associated with the negative reactions to poor etiquette factor (r = .22), indicating that those with a stronger sense of moral identity also experienced negative reactions to perceptions of poor driver etiquette from other drivers.

Very few significant correlations were found between mindfulness and the cognitive variables: those with greater mindfulness perceived less negative emotion (r = -.15), and greater mindfulness had a positive but weak correlation with scores on the leading by example factor (r = .13).

To sum up, the strongest relationships between the person-related factors were found between anger rumination and hostility (r = .66), and anger rumination, and trait anger (r =.61). The strongest relationship found between person-related factors and cognition was between anger rumination and negative emotion (r = .46), followed by the relationship between anger rumination and the reprimanding poor driving factor (r = .39). The strongest relationship observed between the cognitive factors was between hostile attributions and negative perception (r =.62), followed by the association between negative reactions to poor etiquette and cognitions regarding reprimanding poor driving.

Table 5.10. Correlations between person-related and cognitive variables.

		Person-related factors				
		Mindfulness	Hostility	Anger Rumination	Anger	Moral Identity
Cognitive factors	Negative perception	-.05	.16**	.25**	.15*	.11
	Negative emotion	-.15*	.34**	.46**	.32**	.00
	Attributions	-.05	.07	.16**	.14*	.01
	Hostile attribution	-.01	.17**	.22**	.16*	.03
	Negative expectation	-.08	.24**	.25**	.23**	.00
	Reprimanding drivers	-.08	.29**	.39**	.32**	.03
	Reactions to poor etiquette	-.03	.26**	.30**	.25**	.22**
	Leading by example	.13*	.12	-.02	-.04	.36**

** $p = <.001$ *$p = <.05$

5.4.5.2. Analysis of variance

A series of one-way ANOVAs were conducted to explore differences in attributions, negative perception, negative emotion, and purpose of likely behavioural responses in each triggering event condition.

5.4.5.2.1. Negative perception and emotion. Table 5.11 shows the means and standard deviations for the measures of negative perception and emotion in each vignette condition. No significant differences were found between conditions for the level of negative emotion experienced in response the events; however, significant differences between conditions were found for the aggregate level of negative perception $F = 40\ (2,261) = 40.97$, $p = <.001$. Specifically, participants in the cut off at a merge condition ($M = 36.49$, $SD = 6.42$, $t\ (261) = 8.25$, $p = <.001$) and participants in the lane change condition ($M = 35.42$, $SD = 5.18$, $t\ [261] = 7.323$, $p = <.001$) reported significantly greater levels of negative perception regarding the depicted events than those assigned the blocked progress condition ($M = 28.57$, $SD = 6.12$).

Table 5.11. Means and standard deviations for items assessing attribution type by condition

	Cut off changing lane	Cut off merging	Blocked progress
Perception & Emotion			
Negative perception**	35.42 (6.34)	36.49 (6.42)	28.57 (6.12)
Negative emotion	30.43 (7.10)	31.56 (8.74)	29.84 (6.36)
Causal attribution			
Stable-external	2.20 (1.18)	2.99 (1.31)	1.99 (1.06)
Unstable-internal*	3.01 (1.37)	3.22 (1.42)	3.57 (1.50)
Stable-internal**	4.01 (1.19)	4.09 (1.02)	3.17 (1.33)
Unstable- external	3.09 (1.26)	2.60 (1.15)	3.06 (1.27)
Hostile attribution	5.46 (2.75)	5.55 (2.60)	2.97 (2.64)

** $p = <.001$ * $p = <.05$

5.4.5.2.2. Attribution. Table 5.11 shows that internal-stable attributions were the most strongly endorsed in both the merge and lane conditions, whereas internal-unstable attributions were the strongest in the blocked progress condition. ANOVAs to determine if the means for each type of attribution were significantly different between the conditions revealed significant differences for both the internal-stable attribution $F(2,274) = 17.31$ $p = <.001$ and the internal-unstable attribution items $F(2,275) = 4.28$ $p = .015$.

Follow up-test showed that being cut off, either while changing lanes, M = 4.01, SD = 1.20, t(187.850) = 4.63, p = <.001, or while merging, M = 4.09, SD = 1.02, t(175.593) = 5.30 p = <.001, attracted significantly stronger endorsement of internal-stable attributions than having progress blocked by another motorists (M = 3.17, SD = 1.32). Alternatively, having one's progress impeded attracted significantly stronger endorsement of internal-unstable- causes (M = 3.57 SD = *1.50*) compared to the drivers who were cut off by a driver changing lanes, M = 3.01, SD = 1.36, t (188.666) = 2.732, p = .007. No significant differences in endorsement of internal-unstable attributions was found between having ones progress blocked and being cut off by a merging driver.

Additionally, significant differences between conditions were found for hostile attributions of the target driver's behaviour F (2,269) = 28.18, p = <.001. Specifically, stronger endorsement of hostile attributions of the driver's behaviour was found in both the changing lanes condition, M = 5.46, SD = 2.75, t (269) = 6.438 p = <.001) and the merging condition (M = 5.55 SD = 2.71; t (269) = 6.485 p = <.001), compared to the blocked progress condition (M = 2.79 SD = 2.63).

5.4.5.2.3. Purpose of behavioural response between conditions. Means and standard deviations for drivers' self-reported purpose of their likely behavioural responses to events are shown in Table 5.12. A one-way ANOVA revealed no significant differences between vignette conditions in the extent to which participants endorsed each response purpose. Thus despite there being significant differences in the way events are perceived and appraised between conditions, no significant differences exist in the purpose of behavioural responses to them.

Table 5.12. Means and standard deviations for intention motivating behavioural response by event condition.

Purpose of response	Event condition	*M*	*SD*
Behaviour modification	Cut off changing lanes	11.97	5.37
	Cut off at a merge	13.19	5.55
	Blocked progress	11.94	5.00
Venting	Cut off changing lanes	4.44	1.82
	Cut off at a merge	4.88	2.22
	Blocked progress	4.20	2.04
Hostile response	Cut off changing lanes	.45	.09
	Cut off at a merge	.44	.11
	Blocked progress	.46	.08

Modification*: F* (2, 271) = 1.60*p* = .205; Vent*: F* (2, 267) = 2.55 *p* = .080; Hostile*: F* (2, 273) = 1.05 *p* = .350

5.4.5.3. Purpose of response: Multivariate analysis of covariance

Before the MANCOVA results are described, it must be noted that the internal-stable attribution variable was the only causal attribution variable entered in the analysis. It was hypothesised that internal-stable attributions would be the most strongly endorsed attribution in all three conditions. While internal-stable causes were the most strongly endorsed in the cutting off conditions, unstable, internal causes attracted significantly stronger endorsement in the blocked progress condition. However, as described earlier, a larger than expected number of participants had to be excluded from the analysis, which is likely to have adversely affected the statistical power of the analysis. Thus in the interest of enhancing the statistical power of the analysis, the decision was made to only enter the internal-stable variable in the analysis, rather than both attribution variables.

Being a categorical variable, gender was entered as a fixed factor, and all remaining continuous independent variables were entered as covariates. Inspection of Box's test of equality of covariance and Levene's test for equality of variance revealed that these assumptions were met.

The results revealed that the models for all dependent variables were significant, with the model for venting accounting for almost 40% of variance, F (1,172) = 7.96, p =.001, R^2= .393, the model for behavioural modification explaining approximately 31%, F (1,172) = 5.91, p =.001, R^2= .313, and the model for hostile responses accounting for a little over 13%, F (1,172) = 2.64, p =.001, R^2= .133.

Omnibus tests using Roy's Largest Root showed significant effects on purpose of behavioural response for seven different variables: age, $\lambda = .057$, $F(3, 154) = 2.92$, $p = .036$, $\eta = .054$; internal attributions, $\lambda = .104$ $F(3, 154) = 5.33$, $p = .002$, $\eta = .094$; driver cognitions regarding reprimanding poor drivers, $\lambda = .075$, $F(3, 154) = 3.87$, $p = .010$, $\eta = .070$; cognitions regarding negative reactions to poor etiquette, $\lambda = .074$, $F(3, 154) = 3.78$, $p = .012$, $\eta = .069$; cognitions regarding leading by example, $\lambda = .079$, $F(3, 154) = 4.06$, $p = .008$, $\eta = .073$; and total negative emotion in response to the event, $\lambda = .110$, $F(3, 154) = 5.63$, $p = .001$, $\eta = .099$.

Univariate tests for the venting dependent variable (where the purpose of participants' likely behavioural response is to release their thoughts and feelings) revealed significant effects of four of the variables explored: age, the leading by example factor, reactions to poor etiquette and negative emotion. First, a significant effect of age was found such that higher scores on the venting dependent variable were

associated with younger age, F (1,172) =4.45, p =.036, η = .028, β = -.022. Second, a significant effect on venting was also found for the leading by example factor F (1,172) =10.56, p =.001, η = .063, β = -.101, such that higher scores on the venting dependent variable were associated with lower scores on the leading by example factor. Third, significant effects on venting were also found for internal attributions F (1,172) =10.60 p =.001 η = .064, β = .398, negative reactions to poor etiquette, F (1,172) =9.94, p =.002, η = .060, β = .125 and total negative emotion F (1,172) =7.65, p =.006, r = .180, η = .047, β = .062, such that higher scores on these variables were associated with higher scores on the venting dependent variable.

Univariate tests for the two dependent variables considered to reflect aggressive intentions, behaviour modification, and hostile responses each showed a significant effect of one independent variable on each respective dependent variable. Firstly a significant effect on the behaviour modification dependent variable was found for the poor driving should be reprimanded factor, such that higher scores on this factor were associated with higher scores on this dependent variable F(1,172) = 11.44, p =.001, η = .068, β = .607. Secondly, a significant effect on the hostile response dependent variable was found for total negative emotion F (1,172) = 10.30, p =.002, η = .062; however, contrary to expectations, this effect was negative, β = -.004, indicating that lower levels of negative emotion are associated with stronger hostile purposes of response.

Table 5.13. MANCOVA results for the venting dependent variable

Dependent variable	Independent variables	*F*	*p*	*β*	*η*
Venting	Gender	0.90	.346	-.26	.01
	Age*	5.01	.026	-.02	.03
	Mindfulness	1.23	.270	-.01	.01
	Moral Identity	0.03	.870	.00	.00
	Anger	0.01	.927	.00	.00
	Rumination	1.85	.181	-.02	.01
	Hostility	3.50	.555	.02	.01
	Negative Expectations	0.00	.999	-.09	.00
	Poor driving should be reprimanded	0.18	.178	.09	.01
	Reactions to poor etiquette**	8.38	.004	.11	.05
	Leading by example**	14.89	.000	-.12	.08
	Internal-Stable attribution	9.21	.003	.37	.05
	Hostile attribution	0.25	.616	-.03	.00
	Negative perception	0.54	.463	.02	.00
	Negative Emotion*	8.41	.004	.0	.05

R^2 = .37 F = 8.10 p = .001; * p = <.05 ** p = .001

Table 5.14 . MANCOVA results for the behaviour modification dependent variable

Dependent variable	Independent variables	*F*	*p*	*β*	*η*
Behaviour Modification	Gender	0.04	.836	-.15	.00
	Age	1.76	.186	.04	.01
	Mindfulness	0.17	.685	-.01	.00
	Moral Identity	0.01	.978	.00	.00
	Anger	0.70	.791	-.02	.00
	Rumination	0.20	.889	.01	.00
	Hostility	0.24	.685	-.04	.00
	Negative Expectations	0.19	.664	-.05	.00
	Poor driving should be reprimanded**	14.02	.000	.645	.08
	Reactions to poor etiquette	1.90	.170	.18	.01
	Leading by example	4.08	.045	-.17	.02
	Internal-Stable attribution	0.78	.186	-.29	.01
	Hostile attribution	0.91	.342	.14	.01
	Negative perception	2.74	.086	.13	.02
	Negative Emotion	5.80	.077	.15	.04

R^2 = .31 F = 5.91 p = .001 ** p = .001

Table 5.15. MANCOVA results for the behaviour hostile response dependent variable

Dependent variable	Independent variables	*F*	*p*	*β*	*η*
Hostile response	Gender	1.77	.185	-.02	.01
	Age	0.04	.851	.00	.00
	Mindfulness	0.01	.919	.04	.00
	Moral Identity	1.16	.283	.00	.01
	Anger	0.17	.685	-.01	.00
	Rumination	0.09	.764	.00	.00
	Hostility	0.11	.742	.00	.00
	Negative Expectations	2.90	.090	.00	.02
	Poor driving should be reprimanded	0.74	.392	-.00	.04
	Reactions to poor etiquette	1.06	.305	.02	.01
	Leading by example	0.85	.357	.01	.01
	Internal-Stable attribution	4.00	.077	-.01	.02
	Hostile attribution	0.02	.883	.00	.00
	Negative perception	0.00	.976	.01	.00
	Negative Emotion**	12.23	.001	-.04	.07

R^2 = .13 F = 2.64 p = .001 ** p = .001

5.5. Discussion

The preceding sections have provided the results of the final study of the program of research: a quantitative exploration of the key components of the proposed model and applying them towards accounting for both aggressive and non-aggressive behavioural responses. This study sought to provide preliminary evidence towards the proposed model, establishing the contribution each component of the model may make in explaining both aggressive and non-aggressive behavioural responses. The following sections will summarise the results as they pertain to the hypotheses provided in section 5.2 and the research questions guiding the program of research. Implications of the results will be discussed, as well as strengths and limitations of the current study.

5.5.1. Support for hypotheses

Fourteen hypotheses were tested in the current study. The following section will describe the level of support obtained for each from the current results.

H_1: Drivers who perceive they were cut off will report stronger negative perceptions and emotions and will report stronger endorsement of hostile attributions than drivers who perceive their progress was blocked.

Overall, the results show support for this hypothesis. Although there were no significant differences in the reported levels of negative emotion in response to each event, cutting off events were perceived as significantly more negative than events where progress was blocked. In addition, significantly greater endorsement of causal attributions that emphasise inherent personality characteristics of the offending driver were found for cutting off events compared to instances where progress was blocked. Finally, significantly greater hostile intent was attributed to the other driver for cutting off events compared to those where progress was blocked. These findings support arguments based on Weiner's theory that driving events that are likely to be attributed to internal causes and regarded as deliberate arouse stronger negative perceptions than events that can be attributed to other causes (e.g., a lapse in attention).

H_2: Drivers who perceive they were cut off will report stronger aggressive intentions for their response to the event than drivers who perceive their progress has been blocked.

This hypothesis was not supported. There were no statistically significant differences in the purpose of behavioural responses between conditions. When considered alongside the results pertaining to hypothesis one, these findings suggest that although there may be differences in the way different types of provocations are perceived and appraised, aggressive intentions in response to them are not dependent on the type of provocation, at least as operationalised in this study.

H_3: There will be a significant effect of age such that younger drivers will report stronger aggressive intentions with their behavioural response to potentially provocative on-road events.

This hypothesis was partially supported by the results. Age was related to younger drivers' tendency to indicate that they intended their response to allow them to vent. However, in accordance with the definition of driver aggression adopted in the current research, venting is not regarded as aggressive. Therefore, while a significant association between age and response to provocations was apparent, it was not in relation to a response considered to be aggressive; thus only lending partial support to this hypothesis. No significant relationship between age and responses regarded as reflecting aggressive intentions were evident in the results.

H_4: There will be a significant effect of trait mindfulness and moral identity such that greater mindfulness and moral identity will be associated with weaker aggressive intentions accompanying drivers' behavioural responses to potentially provocative on-road events.

This hypothesis was not supported by the current results, with no relationship between scores on measures of mindfulness and moral identity, and drivers' responses to potential provocations (either aggressive or non-aggressive as defined by the current study) evident in the current results. Although inspection of the beta-weights for mindfulness indicated that mindfulness had a negative association with all three behavioural intentions that was supportive of the suggested relationship between these constructs, the results did not reach statistical significance. Further, inspection of the beta-weights for moral identity revealed almost no relationship between scores on the measure of moral identity and aggressive or non-aggressive behavioural intentions.

While investigation of mindfulness and moral identity was intended to be exploratory, these findings are somewhat unexpected. In particular, the rationale for the inclusion of mindfulness in the current study was strong: mindfulness has been shown have a negative relationship with aggression in a wide variety of settings, and a recent study found that mindfulness training was effective in decreasing driver aggression (Kazemeini et al., 2013). However, the current results do not lend support for suggestions that greater awareness of the present moment and a stronger identification with traits describing a moral person protect against driver aggression.

H_5: There will be a significant effect of trait anger, rumination and hostility such that higher scores on these variables will be associated with stronger aggressive intentions accompanying drivers' behavioural responses to potentially provocative on-road events.

This hypothesis was not supported. No significant relationships between trait hostility, anger, and anger rumination, and aggressive or non-aggressive responses were evident in the current results. These findings are unexpected, as they contrast with much of the previous research. In particular, trait anger has been extensively investigated for its role in contributing to driver aggression, and there is compelling evidence that demonstrates that trait anger is positively associated with driver aggression (see section 2.8.2.1). Nevertheless, trait anger did not reach statistical

significance in the present study. Further, a handful of previous studies (e.g., Matthews & Norris, 2002) have demonstrated positive relationships between trait hostility and driver aggression; an association that was not replicated in the current results. Finally, building on recent findings from Suhr and Nesbit (2013) and the strong body of research from general aggression, the effect of trait anger rumination on driver aggression was explored in the present study, but did not reach statistical significance.

H_6: There will be a significant effect of hostile attributions such that stronger endorsement of hostile attributions will be associated with stronger aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.

This hypothesis was not supported. In contrast to evidence from Matthews and Norris (2002) that stronger hostile attributions for another driver's behaviour are associated with an aggressive response to that behaviour, this finding was not replicated in the current results. Stronger endorsement of hostile attributions regarding the cause of the events shown to participants in each condition was not found to have a significant relationship with either aggressive or non-aggressive behavioural responses to them.

H_{7a}: Internal-stable causal attributions will be the most strongly endorsed type of attribution across all the potentially provocative on-road events.

H_{7b}: There will be a significant effect of internal-stable attributions such that stronger endorsement of these attributions will be associated with aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.

Partial support was obtained for these hypotheses. Statements attributing the cause of the event to personality characteristics of the offending driver received significantly stronger endorsement where the provocation was either of the two events involving being cut off rather than having one's progress blocked. Unstable, internal causes were more strongly endorsed in the blocked progress condition, thus Hypothesis 7a was not supported. Additionally, the results lend partial support to Hypothesis 7b. A significant association was found between attributions and purpose of behavioural responses, such that driver tendency to indicate that they intended their response to allow them to vent was associated with stronger endorsement of stable,

internal causes for the event (i.e., attributions that emphasise dispositional characteristics of the offending driver). However, venting is not considered aggressive in the current study; thus, contrary to expectations, the results do not suggest an effect of internal-stable attributions on driver aggression.

H_{8a}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that one can expect poor driving from other motorists will be associated with aggressive intentions with one's behavioural response to potentially provocative on-road events.

H_{8b}: There will be a significant effect of cognitions about one's driving environment such that stronger endorsement of negative reactions to poor driver etiquette will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.

H_{8c}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that poor driving deserves to be criticised will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.

H_{8d}: There will be a significant effect of cognitions about one's driving environment such that stronger endorsement of negative stereotypes about other groups of drivers will be associated with stronger aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.

H_{8e}: There will be a significant effect of cognitions about one's driving environment such that stronger agreement that one should set a positive example through one's own driving behaviour will be associated with weaker aggressive intentions accompanying one's behavioural response to potentially provocative on-road events.

Hypotheses 8a-8e pertained to the influence of the driver cognitions identified earlier in the program of research. Before the support for these predictions is described, it must be noted that Hypothesis 8d regarding the effect of stereotypes on aggressive intentions could not be tested. As described in section 5.5.4, this factor had issues with reliability and was thus excluded from the analyses. With respect to the remaining predictions, while hypothesis 8a was not supported, hypothesis 8b was, and mixed support was obtained for hypotheses 8c and 8e.

Hypothesis 8b concerned the effect of beliefs about the inappropriateness of another driver's behaviour and whether it should be reprimanded on aggressive

behaviour. Somewhat unsurprisingly, items stating that motorists who drive poorly should be reprimanded attracted significantly stronger endorsement from drivers who indicated more strongly that the purpose of their behaviour was to criticise the target driver. This finding appears to be consistent with earlier findings in the program of research and evidence from Lennon and Watson (2011), and it lends support to suggestions that for many, the purpose of driver aggression is to teach another driver a lesson with the expectation that they will improve their driving.

Hypotheses 8c and 8d pertained to the effect of the cognitions identified earlier regarding negative reactions to poor etiquette and leading by example with one's own driving behaviour. The current results show significant associations between these cognitions and venting responses: stronger negative reactions to displays of poor etiquette were associated with greater intentions to vent, and stronger agreement that one should lead by example with one's own driving behaviour was associated with lower intentions to vent. Given that the items comprising the leading by example factor were developed from the patterns identified and labelled 'superiority' earlier in the current program of research, where drivers described refraining from an aggressive response ostensibly to avoid demeaning themselves, these findings appear consistent: arguably, drivers who believe they set an appropriate example with their driving behaviour may not consider behaviours that are typically synonymous with venting (swearing, name-calling, etc.) as appropriate driving behaviour and would be arguably less likely to engage in them.

H_9: There will be a significant effect of the cognitive processes involved in perceiving and appraising on-road events such that:

- *H_{9a}: Stronger negative perceptions towards potentially provocative on-road events will be associated with stronger aggressive intentions with drivers' behavioural responses to them; and*
- *H_{9b}: Stronger negative emotions generated in response to potentially provocative on-road events will be associated with aggressive intentions with drivers' behavioural responses to potentially provocative on-road events.*

The results do not lend support to either of these hypotheses: no significant association between negative perception and aggressive or non-aggressive intentions was evident, and while significant associations between negative emotions on

aggressive intentions were evident, they indicated a negative, rather than the expected positive association. Specifically, greater negative emotion in response to events was associated with stronger intentions to vent but with lower hostile intentions in behavioural responses to provocations. This result is surprising and is contrary to predictions; however, drawing on the literature described in Chapter 2 regarding the role of negative emotion in fuelling aggressive behaviour that has been found to follow ego threats may help to reconcile this finding. Evidence indicates that rather than producing emotional distress, negative emotion is absent or muted in socially rejected individuals who behave aggressively following the rejection (Twenge et al., 2001). Extrapolating this to the current findings, it is possible that a similar mechanism is at work in the driving environment: drivers who respond with aggressive intentions to antagonise the target driver may perceive the triggering event as a threat to their ego. Accordingly, they may experience a dulled emotional reaction, thus bypassing an effect on mood, and instead, directly affecting an aggressive behavioural response. Furthermore, these results may also suggest more readily accessible aggression schemas for drivers whose intentions are to antagonise, such that their responses to potentially provocative events may require less conscious processing. This will discussed further in section 5.5.

H_{10}: Mindfulness and moral identity will be positively correlated with each other, but negatively correlated with anger rumination, anger, and hostility.

Partial support was obtained for this hypothesis. Consistent with the expected relationship, higher levels of mindfulness, a factor thought to protect against driver aggression, were significantly associated with lower levels of anger rumination, hostility, and anger; factors that have been shown to increase driver aggression. However, while a negative relationship between moral identity and anger rumination, hostility, and anger was found, the relationship was very weak and failed to reach significance. Moreover, the relationship between mindfulness and moral identity was almost non-existent and not statistically significant.

H_{11}: Cognitions and cognitive processes will be positively associated with trait anger, anger rumination, and hostility such that:

- *H_{11a}: Cognitions identified as likely to increase driver aggression will be positively associated with trait anger, anger rumination, and hostility.*

Hypotheses 11a-11c, along with hypothesis 12 reflected arguments that person-related factors influence aggression through the cognitions they generate and were thus designed to explore potential relationships between person-related factors and cognitions with a view to informing future directions for research investigating the model.

Hypothesis 11a was supported by the results. The three factors that reflected cognitions thought to increase driver aggression were labelled in the current study as negative expectations of other's driving behaviour, poor driving should be reprimanded, and negative reactions to perceived violations of driver etiquette. They all had significant, albeit it weak, positive correlations with anger rumination, anger and hostility.

- *H_{11b}: Negative perceptions of potentially provocative on-road events will be positively correlated with trait anger, anger rumination, and hostility.*

This hypothesis was supported. Greater negative perception of potentially provocative driving events had significant, positive associations with anger rumination, hostility, and anger. The strength of these correlations ranged from weak to moderate: weak associations were found between trait anger and negative perception and attributions, whereas the strongest relationship was found between anger rumination and negative emotion. This suggests that those with a greater tendency to ruminate also experience greater negative emotions when faced with potentially provocative on-road events.

- *H_{11c}: Negative emotions generated in response to potentially provocative on-road events will be positively correlated with trait anger, anger rumination, and hostility.*

This hypothesis was supported. Stronger reported negative emotional responses to potentially provocative driving events had significant, positive associations with anger rumination, hostility and anger

H_{12}: Cognitions identified as likely to increase driver aggression will be negatively correlated with mindfulness and moral identity.

Mixed support for this hypothesis was obtained from the current results. While all correlations between mindfulness and the cognitive variables identified as likely to increase driver aggression were negative, they were weak and failed to reach statistical

significance. However, while correlations between moral identity and the cognitive factors were weak and non-significant for the negative expectations and poor driving should be reprimanded factors, significant, positive associations were found for the remaining two factors (negative reactions to poor etiquette and leading by example).

A significant relationship was found between scores on the moral identity scale and the "negative reactions to poor etiquette" factor such that those who identify more strongly as a moral person reported significantly greater negative reactions to displays of poor driver etiquette. Furthermore, there was a positive association between scores on the moral identity scale and the "leading by example" factor, indicating that those with a stronger sense of moral identity also strongly endorse setting a good example of appropriate driver with their own behaviour.

These findings are consistent with those described in Chapter 3. To elucidate, interest in the role of moral identity grew from unexpected results described in Chapter 3, where a pattern of responses in diary comments suggested that some drivers refrain from aggressive retaliation because they seemed to feel it would be degrading and would lower their standards to that of a driver they perceived as rude. However, these drivers still described experiencing negative reactions to the reported event. Reflecting this, the current results show that drivers with a strong sense of moral identity also believe they demonstrate adequate courtesy through their own driving but experience negative reactions when they feel courtesy has not been displayed in return.

H_{13}: Cognitive processes will be negatively associated with mindfulness and moral identity such that:

- *H_{13a}: Negative perceptions of potentially provocative on-road events will be negatively correlated with mindfulness and moral identity.*
- *H_{13b}: Negative emotions generated in response to potentially provocative on-road events will be negatively correlated with mindfulness and moral identity.*

Mixed support was obtained for these predictions. Lending support to them, mindfulness had negative but weak associations with negative perception and emotion; however, only the association between mindfulness and negative emotion was significant. But contrary to predictions, correlations between moral identity and negative perception and emotion were positive, albeit weak, and failed to reach statistical significance. The positive association between moral identity and negative

perception and emotion, although not significant in the current research, could suggest that while moral identity may not necessarily protect against a negative interpretation and appraisal of an on-road event, it may protect against an aggressive response based on this appraisal.

H_{14}: The identified cognitions and cognitive processes will be more strongly associated with aggressive intentions accompanying behavioural responses to potentially provocative on-road events than person-related factors will be.

As described in section 5.2.4, this hypothesis was proposed to guide a preliminary investigation of the proposed model, to explore how well it can account for driver aggression and what each component can contribute towards explaining driver aggression. Overall, results appear to demonstrate support for this prediction: the models for both aggressive and non-aggressive behavioural responses were statistically significant, with the model for non-aggressive intent accounting for the most variance (40%) and the model for hostile aggressive intentions accounting for the least (13%).Although it must be acknowledged that all effect sizes were small, relatively larger effect sizes were found for the cognitive factors explored in the current study compared to the effect sizes for person-related factors. Moreover, no significant effects on both aggressive and non-aggressive behavioural responses were found for person-related factors, with the only significant results pertaining to the influence of cognitions and cognitive processes. Considered collectively, these results thus lend support to this hypothesis. These findings are consistent with Yagil's results described in section 5.2.3, and lend support to the suggestion that the fundamental ways in which drivers think about and conceptualise their driving environment are key determinants of subsequent behaviour.

5.5.2. Implications for research questions

Research Question 1: *What person-related factors (both protective and risk-inducing) influence driver aggression?*

Person-related factors, both protective and risk factors, did not appear to be strong influences on driver aggression in this study. Five person-related factors were explored, three factors with the potential to increase driver aggression (trait anger, hostility, and anger rumination) and two factors that may protect against driver aggression (mindfulness and moral identity). Despite all five of these factors having strong theoretical and empirical underpinnings supporting their inclusion in the

current study, little evidence demonstrating their effect on both aggressive and non-aggressive intentions was found.

Given that most previous research has been dedicated to identifying personality traits that can predict greater levels of driver aggression, the lack of influence of person-related factors thought to increase driver aggression in these findings is particularly unexpected. Trait anger is one of the most widely investigated person-related factors in driver aggression, but despite a plethora of evidence demonstrating a positive effect on aggression, no significant effects of trait anger on driver aggression were evident in the current study. Additionally, the current results concerning trait hostility and anger rumination also failed to align existing evidence.

Two possible explanations for these dissimilar and unexpected findings are proposed. Firstly, it is possible that the results are due to diminished statistical power. As will be addressed in section 5.5.4, the sample size of the study was smaller than planned due to the unexpected but necessary exclusion of participants due to misinterpretations of the stimulus. This resulted in a less than desirable sample size (N = 173) based on the recommended G-Power analysis (N = 204). As such, the sample size may not have been large enough to detect the effect of these factors.

Alternatively, it is plausible that the dissimilar results obtained in the current study stem from the way in which driver aggression was operationalised. Previous studies exploring the influence of personality traits on driver aggression have tended to define driver aggression in terms of a list of driving behaviours that are considered to be aggressive. In contrast, the current study conceptualised driver aggression in terms of intentions motivating the behavioural response; acknowledging that the same behaviour may have different underlying motive for different drivers or for the same driver in response to different situations. Thus it is possible that in previous studies, person-related factors had a demonstrated influence on the type of behaviour that drivers with particular personality traits engage in but not the underlying intentions that motivated these behaviours. As such, these results further highlight the importance of considering the intentions of behaviour rather than the behaviour in isolation.

With respect to protective factors, the results of the current study cannot provide substantial evidence for the role of the person-related factors theorised to protect against driver aggression that were explored in the present study: mindfulness and moral identity. Despite having a strong theoretical and empirical rationale for

inclusion, mindfulness and moral identity were not found to significantly decrease the likelihood of driver aggression, nor were they found to increase the likelihood of non-aggressive responses. Furthermore, although many of the results revealed relationships that were consistent with the theorised effect on driver aggression, these results were weak and non-significant when the effect on aggressive intent was explored.

Although the role of the protective person-related factors was not supported by the current results, the results did reveal several cognitive factors that have an effect on non-aggressive intentions. Specifically, internal attributions, negative emotion and negative reactions to poor etiquette were associated with stronger intentions to vent. Given that venting is not considered aggressive, using the definition adopted in the current research, the results could be regarded as evidence of factors that may temporarily decrease aggressive responses. However, they cannot be regarded as protective against driver aggression in light of research suggesting that venting increases the likelihood of experiencing anger and aggression in response to subsequent events. This will be addressed in section 5.5, along with other implications of the current results for the model.

Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*

This research question sought to address gaps in the literature concerning the underlying reasons why particular types of events trigger driver aggression. The findings of the current study complement the findings of the previous studies in the program of research and suggest that differences exist in the way that particular types of on-road provocations are perceived and appraised. Such differences may then give rise to greater levels of negative perception and negative emotion. In particular, cutting off events, which are more likely to be perceived as deliberate, were perceived more negatively and were reported to arouse greater levels of negative emotions than potentially provocative situations where a driver's progress was impeded. Cutting off behaviours also attracted stronger endorsement of hostile attributions and causal attributions that emphasise dispositional characteristics of the offending driver. Nevertheless, despite differences in the way events were perceived and appraised, they did not appear to influence aggressive intentions that motivate behavioural responses to them. A potential implication of these results is that

motorists who engage in acts of driving aggression are likely to do so regardless of the event.

Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*

The results of the study were able to provide some interesting insights into the effect of drivers' cognitions and the cognitive processes that unfold following a provocation on behavioural responses. Specifically, there are three key results that provide evidence demonstrating an effect of cognition on subsequent aggressive responses.

Firstly, stronger agreement with items stating that drivers should experience retribution when they behave poorly had a positive association with intentions to criticise the target driver with a response, arguably with a view to modifying their behaviour. On the surface it may seem obvious and not particularly informative that drivers who agree that poor driving should be reprimanded report stronger intentions to criticise poor driving; however, this positive association highlights that drivers' beliefs about other motorists and the driving environment may be important in influencing drivers' behaviour. Furthermore, this study sought to explore whether the findings from the earlier qualitative investigations could be generalised. Accordingly, these results can be regarded as further support for the conclusions drawn in the earlier studies of the program of research that the purpose of aggressive responses for some drivers is to reprimand or 'teach a lesson' to another driver regarding their poor driving behaviour.

Secondly, as described earlier, a negative association rather than the expected positive one was found for the effect of negative emotion on hostile responses where the intention was to antagonise the driver. However, drawing on evidence demonstrating that negative emotion appears to be absent in aggressive responses following ego threats, it is possible that drivers who respond with hostile intentions may perceive the provocation as a threat to their ego and thus experience dulled negative emotions. Extensive evidence suggests that most drivers consider their driving to be better than other motorists (see section 2.4.2), and it has been suggested, based on the findings of the earlier studies in the program of research, that drivers may perceive potentially provocative on-road events as criticisms of their driving, which presumably threatens their driving ego. Based on this reasoning, it is

possible that drivers who report more hostile intentions for their responses may have a greater ego surrounding their driving abilities —representing a potential avenue for further investigation.

The results also provided evidence for the effects of cognition on non-aggressive responses, specifically responses where the purpose is to vent one's thoughts and feelings following an on-road provocation. Based on the definition of aggression used in the current research, rather than aggressive intentions, drivers who reported stronger negative reactions to poor driver etiquette, endorsed attributions of the provocative on-road event emphasising stable, dispositional characteristics of the offending driver and reported greater negative emotions were found to report greater intentions to vent. Interestingly, intentions to vent had a negative association with the leading by example factor, suggesting that drivers who agree they should set a good example with their driving behaviour appear less likely to vent in response to on-road provocations.

In exploring this research question, relationships between person-related factors and cognitions were investigated, with the intention of offering empirical evidence regarding how these factors may interact and providing informed directions for future research to explore their interactive effects on driver aggression. The results revealed patterns that would be expected based on the theoretical constructs explored: drivers with stronger dispositions towards anger rumination, anger, and hostility reported stronger negative perceptions of on-road provocations, greater negative emotion, and stronger endorsement of internal, hostile attributions regarding the cause of the event. Positive correlations were also evident such that stronger tendencies towards anger, hostility, and anger rumination were associated with stronger endorsement of cognitions identified as likely to increase driver aggression. In particular, drivers prone to rumination more strongly agreed that poor driving should be reprimanded, which was also associated with stronger reactions to poor driver etiquette. Stronger agreement that poor drivers should be reprimanded was also associated with stronger endorsement of internal and hostile attributions as well as negative perception and negative emotion.

Taken as a whole, the strongest correlations that emerged were between trait anger rumination and the cognitive factors, which would appear to be consistent with arguments that anger rumination affects aggression by focusing attention towards negative cognitions, thereby exacerbating them. As such, it is possible that no effects

of anger rumination on driver aggression were evident in the current research because it focused on its effect in isolation. Accordingly, exploring the interactive effects of person-related factors, particularly anger rumination, on cognition represents an avenue for future research that may help to further enhance understanding of the factors that influence driver aggression.

Results concerning the relationship between mindfulness and cognition followed the expected negative direction, although very few correlations were statistically significant. The results also showed a relationship between moral identity and the leading by example and reactions to poor etiquette cognitions such that those with a stronger sense of moral identity agreed that one should lead by example with their driving and agreed that they experience stronger negative reactions when they feel another driver has not displayed courtesy. Although this finding is consistent with the patterns described in Chapter 3, neither moral identity nor the cognitions were significantly associated with driver aggression.

Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

The current study identified three different purposes of behavioural responses to on-road events that appear to reflect both aggressive and non-aggressive intentions. Two aggressive intentions motivating responses were identified. Firstly, behavioural responses where the purpose was to amend or improve the target driver's behaviour were regarded as reflecting aggressive intentions, based on the argument that these motorists may anticipate that the negative criticism will provide the impetus for the target driver to improve their driving. Secondly, underlying aggressive intentions were apparent in responses where the purpose appeared to be to frustrate, intimidate, and inconvenience the target driver. By contrast, non-aggressive intentions were identified in drivers where the purpose of their likely behavioural response to on-road triggers appeared to be to vent their thoughts and frustrations regarding the trigger, rather than to cause harm to the target driver.

The findings regarding intentions to criticise another driver with likely behavioural responses are consistent with both earlier findings in the program of research and a recent study by Lennon et al. (2011); however, given that intentions of behavioural responses have not been widely explored in the driver aggression

literature, the findings concerning intentions to vent and hostile responses appear to be novel.

5.5.3. Implications for the model

The current study aimed to conduct a preliminary investigation of the key components of the proposed model, applying them towards explaining aggressive and non-aggressive behavioural responses. The current results provide preliminary evidence that shows some support for the model: the combined influence of person-related factors, and cognitive factors were significant in accounting for both aggressive and non-aggressive behavioural responses. The model accounted for almost 40% of the variance in non-aggressive responses, a little over 30% of variance for aggressive responses where the intention appears to be to criticise, and 13% of the variance in aggressive responses where the intention appears to be to antagonise. However, although these models were statistically significant, between 60 and 87% of variance was left unaccounted for, highlighting that further research is needed to explore factors that contribute to driver aggression.

Furthermore, many of the significant effects observed in the current study concerned non-aggressive behavioural responses, where the intention appears to be to vent thoughts and feelings. Taken at face value, these findings would suggest that, at present, the model may be more effective in explaining non-aggressive behaviour than it is in explaining aggressive behaviour. However, when evidence demonstrating that venting is likely to increase negative emotions and aggressive responses to subsequent provocations is taken into consideration, these results may have important implications for driver aggression. Despite widely-held beliefs that encourage venting as a way of purging negative emotions, empirical evidence supporting the efficacy of venting is lacking. In fact, meta-analyses demonstrate that venting promotes anger and aggression rather than extinguishing it, and the likelihood of an aggressive response to a subsequent provocation has been found to increase following venting (Geen and Quanty, 1977). Therefore, although some of the factors explored in the current study may have been be associated with venting in response to a single provocation, these factors may not protect against driver aggression. Specifically, venting in response to a single provocation may actually be increasing the likelihood of an aggressive response to a provocation experienced later in the journey. In this respect, it would be interesting to replicate the current study as

a repeated measures design in order to explore the effect of multiple provocations experienced in a single journey on responses to each subsequent event.

Additionally, implications regarding venting are also apparent when considered alongside the findings concerning the prevalence of behavioural responses documented earlier in the research. The content analysis described in Chapter 3 suggested that the most commonly reported behavioural responses appeared to be designed to vent frustrations within the confines of one's vehicle, which by the current definition, is not regarded as aggressive. When discussing this finding in Chapter 3, it was noted that it is possible that drivers may conceptualise driver aggression as experiencing anger when driving and, accordingly, regard themselves as aggressive drivers because they experience negative emotions when driving. In actuality, their behaviours do not appear to be intended to harm another motorist, and therefore driver aggression, as conceptualised by the current definition, may not be quite as prevalent as self-reports would suggest. The current results appear consistent with these suggestions: factor loadings were highest for items reflecting intentions to vent feelings (.964 and .890), and despite only consisting of two items, most of the significant results concerned venting. To that end, though, as acknowledged in the discussion of Chapter 3 (section 3.12.1), that participants in Study 3 also may not have used the same definition of driver aggression that the thesis author used to interpret their comments as they used to report it.

Finally, there are also implications for the model stemming from the results concerning aggressive intentions. While the current results support the important role cognition plays in influencing behaviour, they also suggest that cognition is multifaceted in nature, and may have a different effect on the two aggressive intentions identified in the current study. Specifically, the influence of cognition on aggressive responses intended to criticise may involve more conscious processing, whereas processing may be highly automated for drivers responding with aggressive intentions to antagonise the target driver.

Cognitive factors were found to have a significant effect on intentions to criticise but not hostile responses. Specifically, drivers in the current study who more strongly described the purpose of their likely behavioural response as being to criticise the target driver also agreed more strongly that motorists who drive poor should be reprimanded (one of the cognition measures). In contrast, none of the cognition measures or measures reflecting cognitive processes such as attribution and perception

appeared to have an effect on drivers who described more strongly wanting to antagonise the target driver. In fact, the only factor demonstrating a significant effect on these more hostile responses was negative emotion, but the association was negative, which suggests that drivers engaging in hostile responses may not experience strong negative emotional reactions to them. Thus, because cognitive factors appeared to have a significant effect on intentions to criticise but not hostile responses, it is possible that aggressive responses where the intention is to criticise may involve more conscious processing. Arguably, drivers intending to criticise motorists to "teach them a lesson" have to first consciously perceive and appraise the event as necessitating a 'lesson', before a response is made. Alternatively, drivers who have stronger hostile intentions may have stronger, more readily accessible aggression schemas, such that their responses to events may be more automated and require less conscious processing, thus bypassing an immediate effect on cognitive processes (Huesmann, 1988). This explanation is also consistent with the explanation offered earlier in section 5.5.2 regarding the absence of negative emotion in aggression following ego threats. Adding to this argument, research examining the relationship between aggressive behaviour following ego threat also indicates that perceptions of ego threat are associated with stronger tendencies towards hostile attributions that promote appraising one's environment as threatening (DeWall & Anderson, 2011; Dodge, 2006; Dodge & Coie, 1987; Nasby et al., 1980; Reijntjes et al., 2011). Therefore, it is possible that those prone to perceiving threat in their environment develop stronger aggression schemas, meaning that events in their environment that trigger this schema require less processing to generate negative emotions.

5.5.4. Strengths and limitations

The current study had three major strengths that must be acknowledged. First and foremost, this investigation of the role of cognition in driver aggression represents an important step forward in enhancing current understanding of driver aggression. Secondly, the proposed model had a strong conceptual underpinning based on the GAM, thus providing a solid theoretical framework to guide the current investigation. Thirdly, the current study built upon the foundation laid by the preceding qualitative investigations, to allow gaps in existing knowledge to be addressed before conducting an initial investigation of the proposed model.

Two key limitations that warrant discussion have also been identified: technological limitations and limitations relating to the sample of participants. First, there were issues surrounding the use of relatively new and constantly evolving technology used to host the online survey. While it was recognised that there were advantages in presenting the questionnaire online: it allowed for the questionnaire to be distributed to a large sample with relative ease, and was time and cost effective, a glitch in the software used to host it resulted in three items on the anger rumination scale being omitted from the questionnaire; compromising the integrity of the validated scaled. As a consequence, the effect of anger rumination was not able to be adequately explored, and it is possible that significant effects may have emerged with all items included.

Furthermore, there are limitations that must be acknowledged regarding the use of dashcams to capture naturalistic driving footage in the current study. While the use of video vignettes rather than traditional written vignettes undoubtedly enhanced the realism of the events being depicted to participants, the footage was only able to offer a limited perspective: they were not able to capture sound, and were only able to capture the events occurring directly in front of the driver. The rear-view and side-view perspectives, in conjunction with audio cues that would ordinarily provide drivers with additional information to help contextualise driving events could not be captured by the dashcams. As a result, it is possible that some driver's perceptions of the events shown in the videos may have been distorted by the limited perspective depicted or they may have experienced issues determining what events the footage was intended to show.

This issue was certainly apparent in responses describing perceptions of the scenario that intended to depict impeded progress behind a slow driver, which had to be completely disregarded from all analyses. Although it is plausible that this event experienced such a high level of discrepancy in the way it was perceived due to difficulties inherent in adequately depicting speed on camera, it is possible that this situation may have been perceived more accurately if information from the side and rear-view perspectives was also available. In a real-life situation, drivers would have information provided by their rear-view mirror (e.g., seeing the motorists travelling behind them approaching at speed and slowing down before overtaking) in addition to the information in front of them (e.g., their own reduced speed) as an indication that the driver in front of them is travelling below the speed limit. To that end, there are

limitations stemming from a loss of statistical power due to the unexpectedly small sample size resulting from the exclusion of this condition. Furthermore, and perhaps related to the reduced statistical power, it must be recognised that although the study found many significant results, the effect sizes were small.

Additionally, the study sample also had an over-representation of full-time employees and drivers who use their vehicles primarily for commuting to work. This represents a limitation because many full-time employees share the same standard working hours (9a.m.-5p.m.), meaning that motorists who drive primarily to work may be more likely to experience peak hour traffic on a regular basis. Although there is little evidence of the impact of traffic congestion on increasing driver aggression, the homogeneity participant driving experiences must be acknowledged. Further, although the use of a media release was considered to be a cost-effective, efficient way to reach a large number of participants in a short period of time, it must be recognised that the release referred to the study as research exploring driver aggression. It is possible that a sampling bias was introduced to the study whereby those who responded to the release and completed the study may have had particularly strong views on driver aggression. It follows then, that the study's sample may not have comprised drivers who were representative of the wider population of drivers.

Finally, it must be acknowledged that two of the constructs that formed the dependent variables (purpose of behavioural response) in the study were based on a principal components analysis where only two items loaded onto each of these factors. As described in section 5.4.3.2, a factor must have a minimum of three items to be considered a factor, thus strictly speaking, two of the dependent variables were not factors. Although the solution was not ideal, it was considered to be somewhat suitable for further exploratory analyses given that there were no cross-loadings between factors and the various criteria used to determine the number of factors all converged on the same solution. Nevertheless, as Osborne and Costello (2009) highlight, factors with fewer than three items can be unreliable and, as such, the results pertaining to these two factors must be interpreted with caution.

5.6. Summary

This chapter has documented the rationale, method, and results of the final study of the research program. This quantitative investigation explored the key components of the proposed model and applied them to explaining driver aggression.

Consistent with the rationale of the program of research, cognition significantly predicted driver aggression. In addition, the study showed that although the model holds promise, more investigation is needed to refine the model, and the relationships appear to be complex. The following chapter will conclude the program of research by providing a summary of the research findings and a discussion of their implications and relevance to the proposed model.

Chapter 6: Discussion

6.1. Introductory comments

The previous chapters have provided a comprehensive account of a program of research that explored the role of cognition in driver aggression, to enable investigation of a proposed model for understanding the phenomenon. To begin, Study 1 used driver diaries to conduct a large scale qualitative investigation exploring drivers' perceptions of, and experiences with, driver aggression. This study laid the foundation for the remainder of the program of research, and helped to contextualise the model by exploring current gaps in knowledge regarding the role of cognition in driver aggression. Building on the information provided in the diaries, Study 2 used in-depth follow-up interviews with a smaller sample of the same drivers, to gain a richer understanding of the cognitions involved in driver aggression at key stages of the model. Finally, Study 3 used the results regarding cognitions from Studies 1 and 2 to conduct a preliminary investigation of the key components of the model, exploring what each of its key constructs can contribute towards explaining driver aggression. The current chapter will provide a summary of the research findings as they relate to the research questions, and discuss the implications of the results for the proposed model. The strengths and limitations of the research will be outlined, as will the contributions of the current research to the literature, before concluding with some recommendations for future research.

6.2. Summary of the research findings

Four research questions were presented in section 2.13 to guide an in-depth exploration of the role of cognition and cognitive processes in the driving context, with a view to informing the further development of a model for understanding driver aggression. These research questions are reiterated below, and a discussion of the relevant findings of the program of research pertaining to each question is provided.

Research Question 1: *What person-related factors (both protective and risk-inducing) influence driver aggression?*

Previous driver aggression research has predominately focused on identifying personality traits (e.g., trait anger) that can predict a stronger likelihood of engaging

in driver aggression; however, factors that may protect against driver aggression have received comparatively little attention. A more holistic understanding of driver aggression can be achieved by understanding factors that both contribute to, and protect against, driver aggression. Thus this question was based on the need to identify person-related factors that may inhibit driver aggression, as well as explore under-investigated personality traits that may increase the likelihood of it. Trait anger, anger rumination and hostility were identified as factors likely to increase driver aggression, and mindfulness and moral identity were identified as factors with the potential to protect against driver aggression. The influence of these factors on driver aggression was investigated in Study 3.

Mindfulness and moral identity did not appear to be strong influences in protecting against driver aggression in the current research. Trait mindfulness was explored based on a compelling body of research from general human aggression literature (e.g., Baer, 2003; Kabat-Zinn, 2003; Kelley & Lambert, 2012; Wright et al., 2009), and recent evidence from Kazemeini et al. (2013) demonstrating that a mindfulness intervention reduced driving anger and aggression in a sample of Iranian taxi drivers. The theorised associations between mindfulness and the other variables explored in the program of research were generally supported by the results: negative relationships between mindfulness and the person-related factors with the potential to increase driver aggression were apparent, and drivers reporting greater levels of mindfulness reported lower negative emotion in response to potentially provocative events. Additionally, relationships between mindfulness and cognitive factors were evident, such that drivers reporting greater levels of mindfulness tended to agree that they lead by example with their driving behaviour, which may suggest that more mindful drivers pay more attention to how their driving is affecting others. However, although these relationships are as would be expected based on the theorised relationship between mindfulness and aggression, the results did not suggest a significant effect of mindfulness on driver aggression. As will be discussed in forthcoming sections, it is possible that this may reflect a lack of statistical power. Alternatively, it must be recognised that Kazemeini et al. (2013) explored the effect of a mindfulness intervention, rather than trait mindfulness. As such, the potential for mindfulness to protect against driver aggression may be as an intervention, rather than as a person-related factor.

Moral identity, the extent to which morality is important to one's self-concept and expressed through behaviour, was identified as a person-related factor with the potential to account for the pattern of results emerging in Study 1, where drivers described a sense of satisfaction stemming from not responding with aggression to an anger provoking event. Arguably, to behave in a manner that is consistent with common conceptualisations of a moral person, drivers who regard moral behaviour as central to their self-concept would be less likely to respond with aggression to a provocation. While those drivers in Study 3 who reported a stronger moral identity also tended to agree that they demonstrate courtesy in their own driving, and that they experience negative reactions when they feel courtesy has not been displayed by others, there was no significant relationship between moral identity as a person-related measure and driver aggression. Thus there was no support for the contention that this factor protects against driver aggression. It is possible for these findings may relate to the measure of moral identity used in Study 3. Specifically, while the moral identity scale may be adequate in capturing how important moral behaviour is to one's self- concept, upon reflection, it is possible that it does not quite capture the self-righteousness and satisfaction that emerged within this theme in Study 1.That is, while the moral identity scale may capture the extent to which an individual values being a moral person, it does not capture the extent to which they feel satisfied or self-righteous.

Contrary to the predictions, trait anger, anger rumination and hostility also did not appear to influence driver aggression in the current research. In contrast to the abundance of existing evidence suggesting that trait anger increases the likelihood of driver aggression, this association was not replicated in Study 3, nor was there evidence suggesting an effect of anger rumination or hostility on driver aggression. However, the theorised associations between anger, anger rumination and hostility, with the other variables explored in the program of research appeared to be supported by the results: drivers in Study 3 who reported greater levels of traits thought to increase driver aggression also reported stronger negative emotional response and greater negative perception of potentially provocative on-road events. Further, drivers who reported greater levels of anger, anger rumination and hostility also reported negative reactions to poor etiquette and tended to agree that poor driving should be reprimanded. Thus while these factors did not appear to be strong influences on driver aggression in the current program of research, given that the

results are supportive of the theorised relationships, it is possible that the unexpected exclusion of a large number of drivers in Study 3 may have resulted in insufficient statistical power required to reveal effects of these factors on aggressive driving behaviour.

Alternatively, it is possible that the lack of alignment with existing evidence reflects differences in the operational definition to focus on intentions attached to behaviour rather than the behaviour in isolation. The current research drew on current perspectives in general aggression research to operationalise driver aggression as intentions to cause harm to another motorist (as described in section 5.5). In contrast, other studies that have focussed on factors that can predict driver aggression have defined the construct in terms of driving behaviours that are commonly regarded as aggressive, which is likely to have resulted in the inclusion of a much broader array of behaviours in those studies than in the current study.

Research Question 2: *What types of on-road events are regarded as provocative by drivers, and why, and how common are they?*

This research question reflected both the initial event and cognition constructs of the model and grew from an identified need to better understand the underlying reasons why drivers regard particular triggers as provocative events that can trigger aggression. Arguably, understanding why drivers perceive particular events as provocations will enrich an understanding of the underlying reasons for any aggressive response to them.

To thoroughly explore this, Study 1 explored the subjective frequency of events that can trigger aggression, with results suggesting that many drivers may encounter provocative events quite regularly. During one week of regular driving, 96% of drivers in the sample reported encountering a least a minor provocation, with an average of five negative events reported throughout the week. Further, Study 3 suggested that there are differences in the way particular events are perceived and appraised: cutting off behaviours, which are more likely to appear deliberate, attracted stronger endorsement of hostile attributions for the offending driver's behaviour, and were perceived as being significantly more negative than having one's progress blocked.

As highlighted in literature review, there has been a tendency for some studies in driver aggression to assume those events that are typically associated with

an aggressive driving response (e.g., tailgating, cutting off) are perceived as provocations because they are dangerous. While Study 1 suggested that events classified as erratic driving (according to the current research) were the most commonly described types of events in driver diaries, the explanations for why these events were regarded as a negative appeared was most commonly because drivers perceived the behaviour as selfish or inconsiderate. Moreover, Studies 1 and 2 highlighted that there are many ways that drivers can interpret the same behaviour. For instance, in Study 1, cutting off behaviours were described by some drivers as provocative events because they could have resulted in a collision, while other drivers regarded these as provocative because they were interpreted as reflecting selfish intentions: the driver was not waiting his or her turn in traffic. Further, Study 2 findings highlighted that the type of events reported by drivers who did not appear to attribute aggressive intentions were similar to those events reported by drivers whose descriptions suggested they did perceive from the other driver's intentions as aggressive (e.g., tailgating, cutting off). Considered collectively, these findings further emphasise the importance of considering the meaning a driver attaches to behaviour, that is, their perceptions and appraisals of an event, rather than focusing on behaviour in isolation. To that end, the findings of the current program of research were able to elucidate some common perceptions of provocative events that may trigger anger and/or aggression while driving.

One of the most prominent themes to emerge from the current research was labelled 'driver etiquette', to reflect drivers' apparent expectations for polite and courteous behaviour from their fellow motorists. Specifically, drivers in the current research appeared to consider appropriate driving behaviour as that which demonstrates respect towards fellow motorists: being considerate and aware of other drivers' safety and needs, and not causing unnecessary inconvenience, as well as demonstrating courteous behaviour that goes above and beyond the legal road rules. Germane to the current research, descriptions of on-road provocations by drivers in Studies 1 and 2 suggested that where a driver perceives that another motorist has behaved selfishly or failed to show consideration may trigger anger and may be responded to with aggression. That is, events that are perceived as having violated driver etiquette have high potential to trigger anger and aggression while driving.

Section 3.11.1 and 4.7.1.2 have provided discussions about the notion of driver etiquette, including its potential links to perceptions of disrespect.

Nevertheless, an understanding of the notion of driver etiquette, and what it encapsulates can be greatly enhanced by an examination of the concept of civility.

6.2.1. Driver etiquette, civility and aggression

The word 'civility' is derived from the ancient Latin word 'civilatis', meaning community or city and current definitions of civility describe it as acts that demonstrate respect, politeness and courtesy towards fellow human beings (Clark & Carnosso, 2008). Considering this definition alongside the origin of the word, civility can be conceptualised as polite, respectful and courteous behaviour that facilitates appropriate, smooth social interactions in communities. In contrast, 'incivility' denotes impolite behaviour that does not show regard for others, representing a breach of this norm that can be conceptualised as a breakdown in the civilised behaviour necessary to effective interactions in societies. Further, literature concerning civility argues that the importance of civility in facilitating smooth social interactions is particularly paramount in social interactions that are more complex, and frequent. As Andersson and Pearson (1999, pg.452) state, when involved in more complicated social interactions, people must 'attune their conduct to that of others by behaving in predictably "civil" ways'. The driving environment is a prime example of one such environment: driving is a complex social interaction that requires motorists to be aware of, anticipate and respond to the behaviour of multiple other drivers at any one point in time. Moreover, driving affords few of the normal opportunities for correcting misimpressions, and is it arguably more important that these types of interactions are as unambiguously civil as possible.

Despite the importance of civility in social interactions, self-report surveys indicate that there is a growing perception in the general population that civility is declining, and incivility is increasing (Pearson, Andersson, & Porath, 2000; Pearson & Porath, 2005b). One area where the effects of incivility have been widely investigated is in organisational contexts, where links have been made between incivility and aggression that parallel those of the current research. Of particular relevance to the findings of the current program of research, Andersson and Pearson (1999, pg. 457) coined the phrase 'workplace incivility' to denote "low-intensity deviant behaviour with ambiguous intent to harm the target, in violation of workplace norms for mutual respect. Uncivil behaviours are characteristically rude and discourteous, displaying a lack of regard for others." Further, Andersson and

Pearson (1999) also describe a cyclical process whereby instances of workplace incivility can escalate and spiral in intensity. Specifically, these authors suggest that incivility rises when colleagues respond to another colleague's uncivil behaviour with increasingly severe or blatant forms of incivility. Further, it is argued that the trigger for escalating incivility is the perceived violation of a social norm of civility, where an individual believes he or she has been mistreated by a co-worker (Andersson & Pearson, 1999; Lim, Cortina, & Magley, 2008).

These concepts appear relevant to one way of understanding the findings from the current research. Similarities between this description of workplace incivility and the current findings regarding aggression in the driving context are evident: driver aggression, particularly in the form of rude behaviour, appeared to be triggered when drivers believed they had experienced poor etiquette; that is, rude or disrespectful behaviour from another motorist, and subsequently responded to it with an equally disrespectful, or uncivil behaviour: aggression. In some instances, these acts escalated further when the target driver likewise responded with aggression. As such, Anderson and Pearson's (1999) conceptualisations of escalating workplace incivility, appears to be similar to the cycle of escalation depicted in the proposed model. Further, there is evidence demonstrating that workplace incivility is associated with aggressive behaviour, with a meta-analysis showing that incivility is a strong predictor of workplace aggression (Hershcovis et al., 2007).

Some authors who accept that the level of incivility is rising in society have speculated that this stems from growing entitlement in society: a 'me first' attitude where people only consider their own needs (Fisk, 2010; Pearson & Porath, 2005a). To that end, the concept of psychological entitlement may also be useful to explaining the findings of the current research.

Psychological entitlement is defined as an enduring and persistent belief that one deserves, is owed, or is justified in receiving, more than others (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004b). Individuals with a strong sense of entitlement have been shown to have an inflated view of the self and greater expectations for more favourable treatment of the self from others, yet show less consideration towards others. Germane to the current discussion, evidence exists demonstrating a positive relationship between a strong sense of entitlement and aggression (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004a). Moreover, there is also evidence demonstrating links between entitlement and incivility,

particularly in tertiary education settings, where greater display of incivility in classrooms has been found to correlate with higher levels of entitlement in students (Kopp & Finney, 2013).

Further, there is also evidence that suggests that entitlement produces cognitive distortions that can influence subsequent behaviour. For instance, while examining entitlement in organisational settings, Harvey and Martinko (2009), found a positive relationship between entitlement and self-serving attributions, or the tendency to make attributions that bolster or protect self-esteem. Consistent with Weiner's causal attribution theory, Chowning and Campbell (2009) found that university students with a stronger sense of entitlement had a stronger external locus of control, suggesting that those students who felt they should do well without expending personal effort were more likely to attribute their poor grades to external sources.

In sum it appears that, in the findings from the current program of research, perceptions that others have exhibited poor driving etiquette served as triggers for driving aggression. Certainly, the descriptions of behaviours in comments that comprised the driving etiquette themes closely resemble those described within the concept of civility. In the extensive studies of civility within organisational settings, links between decreasing civility and rising aggression have been found. Further, there is evidence that breakdowns in civility may stem from a rising attitude of entitlement. Considered collectively, if there are links between entitlement and incivility, and further links between incivility and aggression, entitlement may be a construct worth investigating for its relevance to driver aggression.

Other results from the program of research that have relevance to this research question suggested that the generation of anger and aggression for some drivers was partly due to cumulative effects of repeated exposure to the same type of on-road event. Interestingly, some of these drivers described experiencing anger before the event happened by virtue of expecting it, and feeling as though they had to behave aggressively in response to it, in order to progress their journey (e.g., expecting that drivers would not allow space for them to merge, and feeling as though they must "push in" in order to merge). Other drivers described responding aggressively to events they anticipated the offending driver would engage in based on that driver's behaviour immediately prior to the event (e.g., the offending driver failing to make eye contact with the cut-off driver). Considered collectively, these findings suggest

that drivers' perceptions of some on-road events may begin before the event have transpired on the road. As such, anticipation or the expectation that particular types of events may occur may prime anger while driving for some motorists.

Despite suggestions from Dukes et al. (2001) and James (2000) that stereotypes may be involved in driver aggression, they have received little attention in the driver aggression literature. Consistent with these arguments, findings from Studies 1 and 2 appear to suggest that some drivers' perceptions of the behaviour of certain type of motorists and vehicles may be affected by negative stereotypes about these groups. Across both of these studies, the driving behaviour of p-platers, elderly drivers and drivers from an ethnic minority, as well as drivers of Four-Wheel Drives, trucks and utility vehicles appeared to be influenced by negative connotations associated with them (e.g., p-platers were described as reckless drivers who frequently disregard the road rules). As such, on-road events that involve these groups of drivers may be more likely to trigger anger and aggression for motorists that may hold these views.

Research Question 3: *What types of cognitions and beliefs are associated with increasing or decreasing non-violent driver aggression?*

This research question reflected the cognition construct of the model. Despite findings from Yagil (2001) (see section 2.10.2) suggesting that the way drivers conceptualise their driving environment may influence aggression, the cognitions involved in driver aggression, particularly the underlying beliefs about the driving environment that drivers hold, have not been widely explored and understanding of cognition in driver aggression is limited. Thus this research question arose from the need to explore driver cognitions and beliefs that may affect the way on-road events are perceived and subsequently responded to.

Studies 1 and 2 adopted qualitative techniques to gain a rich insight into driver cognitions, to learn about ways that they conceptualise their driving environment and that may affect driver aggression. As documented earlier in this section, the theme labelled as "driver etiquette" in the current research was salient in Studies 1 and 2, and appeared to be associated with driver aggression. Drivers described their expectations for polite and considerate driving behaviour and described feeling angered, or annoyed when they perceived a driver had violated driver etiquette by being deliberately inconsiderate. For instance, cutting off

appeared to violate driver etiquette because some drivers' perceived that it was motivated by selfish intentions of the driver to advance their journey. Similarly, descriptions of slow driving were also consistent with perceptions that this constitutes a violation of driver etiquette for some drivers, because they perceived that the slow driver was not showing consideration for how their behaviour may affect other drivers (e.g., by holding them up). Of note, however, drivers in Study 2 highlighted that although they believed that motorists should display appropriate driver etiquette, they expected that most drivers would not drive courteously, based on their perceptions that poor driver etiquette is widespread. Thus it is possible that drivers who have expectations about appropriate etiquette and believe that poor etiquette is common may be more apt to interpret provocative on-road events as displays of poor driver etiquette.

Similarly, findings from Studies 1 and 2 suggested that negative beliefs about other motorists may increase the likelihood of aggression for some drivers. Drivers in these studies used derogatory words such as stupid or idiot to describe their fellow motorists, and described the standards of their driving behaviour as poor, yet widespread such that they appeared to regard poor driving as "normal", but unacceptable. Drawing on theories of confirmation bias (see section 4.8.1), it can be argued that individuals are likely to seek out information that confirms what they already believe. Thus drivers who believe that poor driving is widespread may expect to encounter it in their regular driving and may be more alert to instances that align with these expectations. Interestingly, some drivers who commented on their perceptions of poor driving behaviour described feeling as though their own poor driving (e.g., tailgating) was justified, based on their perceptions that many other motorists behave poorly, too. Additionally, as this section will shortly discuss in more depth, in Studies 1 and 2, drivers described the purpose of their aggressive responses as intending to "teach a lesson" to the target driver for their ostensibly poor behaviour, suggesting that these drivers may believe that it is appropriate to criticise drivers whom they perceive to have behaved poorly.

The association between such beliefs, which were identified as having the potential to promote driver aggression, and driver responses to provocations, was explored in Study 3. The findings suggest that drivers who tended to agree that drivers who do the wrong thing should be reprimanded also tended to indicate that the purpose of their response was to criticise the target driver, a response regarded as

an aggressive based on the definition of aggression adopted in this research. Arguably, drivers seeking to criticise another motorist, are likely to anticipate that the negative feedback will be unpleasant, so that the target driver reconsiders their behaviour in future. As such, responses to provocations where the purpose is to criticise were considered aggressive, as they appear to be intended to cause psychological harm to the target driver by reprimanding them. Alternatively, stronger reactions to poor driving etiquette were not associated with an aggressive response, but rather, were associated with venting.

The relevance of Weiner's causal attribution theory in being able to account for driver aggression was highlighted in the literature review, along with evidence from a handful of recent studies that have explored casual attributions in driver aggression. Accordingly, as part of investigating this research question, the program of research also explored the role of cognitive processes such as perception and attribution.

Consistent with current evidence regarding the role of attribution in driver aggression, when describing their perceptions of the cause of the events they reported, drivers in Study 1 appeared to emphasise stable, dispositional characteristics of the other driver. Further, dispositional attributions were the most commonly reported explanation for the cause of the events described in Study 1, whereas explanations that focused on one's own part in causing the event were the least common. However, when the effect of attributions on driver aggression was directly investigated in Study 3, these did not appear to influence driver aggression. First, hostile attributions did not appear to influence driver aggression in the current research, which contrasts with evidence that suggests a positive association between hostile attributions and driver aggression. Second, drivers who endorsed internal-stable attributions and reported stronger negative emotions also tended to endorse non-aggressive responses (venting). Third, somewhat surprisingly, drivers who tended to endorse hostile responses also reported lower negative emotions.

These results are surprising, as they contrast with existing research. While it is possible that some of these disparate findings may reflect a lack of statistical power, as noted earlier, to the best of the author's knowledge, the current program of research reflects one of the first to operationalise driver aggression in terms of the underlying intention to cause harm, and the first to consider the purpose of drivers'

responses to potential provocations. By doing so, the results may highlight the multifaceted nature of cognition on driving behaviour.

As described in section 5.5.1, the current findings suggest that the extent to which cognitive processing affects aggressive behaviour may depend on the purpose of the behavioural response. In Study 3, aggressive responses where the intention appeared to be to criticise may reflect more conscious processing of provocative events: drivers have to perceive the event as necessitating a "lesson" before a response is made. Alternatively, conscious cognitive processing of events may not be as important for hostile responses intended to antagonise another driver. Instead, these responses may reflect a strongly embedded aggression script that facilitates highly automated processing involving little conscious effort. This interpretation of the current results was informed by evidence concerning the relationship between ego threats, hostility and aggression in the psychological approach to human aggression (see section 5.5). Specifically, research exploring the relationship between ego threat and aggression indicates that negative emotions appear to be absent in individuals who respond aggressively following an ego threat, and further, that ego threats are associated with hostility, and perceiving one's environment as threatening. Similarly, lower negative emotion in the current research was associated with a stronger hostile response to provocations. By extension, it is possible that drivers who tended to report hostile, antagonistic responses in the current research may be more susceptible to ego threat. Susceptibility to ego threat may then result in the development of a stronger aggression script that facilitates a highly automated aggressive response that bypasses an effect on emotion, and instead, directly affects behaviour.

The lack of alignment between findings in the current research and existing studies highlights the importance of considering intentions for behaviour when studying driver aggression and not just the behaviour in and of itself. As described previously (section 2.4.1), many previous studies have defined aggression according to a list of behaviours commonly regarded as aggressive and have not explored the intended purpose of these behaviours. If aggression relates to an intention to do harm, a closer inspection of the underlying purpose or motivation for particular behaviours may provide important insights into whether or not a behaviour was, in fact, intended to be an aggressive act. This point may be best illustrated with an example. For instance, if one was to take the behaviour of calling another driver a

name, on the surface, this behaviour may appear aggressive; however, if one driver calls another driver a name under their breath while within the confines of their vehicle, arguably, the motivation for this behaviour is quite different to another driver who chooses to wind down their window and clearly direct their name calling at another specific driver. The former may be an instance where a driver is merely using name calling as a means to vent frustrations whereas the latter represents an instance where the driver's intention was more aggressive in nature whereby they want to do what they can to ensure that the other driver does hear their insult. Thus, if in a study, a researcher was to categorise 'name calling' as the aggressive act occurring in both instances, this example highlights that a potential error in interpretation is being made.

To that end, while in behavioural measures like the DAX and the PADS, which include name-calling as items, intention to harm can quite reasonably be inferred, it still remains just that: an inference. In the current study, participants were directly asked about the intentions for their behaviour, and this was used as the dependent variable and as such, intentions did not need to be inferred from behaviour. Nevertheless, it is acknowledged that the current study is the first of its kind to operationalise driver aggression in terms of intention to harm, and the motivations described in the current program of research are not exhaustive, and there may be other motives, or purposes of driver's responses to provocations, that are not represented in the current research.

Finally, beliefs and cognitions that may be protective against driver aggression were explored as part of this research question. In Study 1, an important group of drivers described refraining from an aggressive response to provocative events, because they did not want to retaliate with a similarly rude behaviour (i.e., aggression) to that of the offending driver. Thus believing that aggressive retaliation is inappropriate may protect against driver aggression. As described, it was suggested that a desire to refrain from an aggressive response may reflect moral identity, but this was not supported by the results of Study 3.

In Study 2, drivers who described that they did not perceive aggressive intent in the actions of other drivers appeared to have a more optimistic view of other motorists than drivers who did describe perceiving aggressive intent. Despite discussing many of the same behaviours (e.g., tailgating, cutting off), these drivers displayed greater empathy, acknowledged that some provocative behaviours may be

errors, and appeared to believe that drivers would not be likely to intentionally harm themselves, or other motorists. Accordingly, their attributions for the provocative behaviour seemed to emphasise mistakes or lapses in judgment. In contrast, drivers who did appear to perceive aggressive intentions appeared to present the negative and somewhat cynical view of other motorists described earlier (see section 4.7.1.), and their attributions appeared to focus on dispositional characteristics of the offending driver. As such, it is possible that a more positive outlook of the driving environment may protect against driver aggression, by promoting appraisals of others' behaviour as non-aggressive. Finally, the results of Study 2 suggest that perceptions that driver violence is prevalent can protect against retaliation to provocative events, due to fear of aggressive counter-retaliation that may escalate into violence.

Research Question 4: *What do drivers aim to achieve when they respond to on-road provocations, and are these aims aggressive?*

This research question reflected the behavioural response construct of the model. It was based on the need to understand the purpose of responses to provocative driving events, and to explore which responses reflect underlying aggressive intentions.

In Study 1, only 12% of drivers described having not responded at all to the negative events they reported in their diaries, suggesting that regardless of whether the behavioural response has aggressive or non-aggressive intentions, most drivers will respond to provocations rather than ignore them. Further, responses classified as intending to harm, that is, aggressive, represented approximately a quarter of the described behavioural responses, while the most commonly described behavioural responses were ones classified as venting frustrations within ones' vehicle. While it was encouraging to note that most drivers did not describe aggressive intentions in their behavioural responses to the event they chose to report in their diary, based on evidence indicating that venting can increase the likelihood of aggression in response to subsequent provocations (Bushman, Baumeister, & Stack, 1999; Bushman et al., 2005; Geen & Quanty, 1977), drivers who respond to an event by venting their frustrations may be unintentionally priming themselves for an aggressive response to events they may encounter later in their journey.

Similarly, venting appeared to be a common behavioural response in Studies 1 and 3, suggesting that for some drivers, the purpose of their responses to on-road provocations is to vent their thoughts, frustrations and feelings without harming the offending driver. The findings of the current research suggesting that venting frustrations is common draws attention to potential differences in the way that researchers conceptualise driver aggression and the way that drivers themselves are likely to conceptualise it. Arguably, many drivers are likely to consider driver aggression to be the experience of anger and frustration when driving, and may consider themselves to be aggressive drivers on the basis that they experience these types of emotions when they drive. As such, when responding to self-report surveys, they may self-identify as an aggressive driver and respond to questions accordingly. However, their behaviours in response to the anger-provoking or frustrating events (e.g., calling drivers' names within their vehicles) do not appear to be to cause harm. Thus it is possible that prevalence rates of driver aggression in self-report surveys may be inflated by drivers who consider driver aggression to be experiencing negative emotions when driving, but do not intend to harm other motorists with their response to provocative events. To that end, the definition of aggression used to determine whether participant's responses could be considered aggressive was not likely to be the same definition that participants used when reporting events. As such, it must be recognised that the prevalence rates of driver aggression reported in the program of research are contingent upon the interpretations made by the thesis author using the definition adopted in the current research.

A salient theme that emerged in Studies 1 and 2 suggested that the purpose of behavioural responses such as horn honking, rude gestures or tailgating appeared to be to criticise the target driver, to teach them a lesson regarding their ostensibly poor driving behaviour. Drivers in these studies described their disapproval of the offending driver's behaviour, and their desire to communicate that disapproval, to make the other aware that their behaviour was poor and that they should not repeat it. That is, drivers engaging in these types of responses appeared to be intending to inflict psychological harm by criticising another motorist, with the hope that the negative feedback would encourage the target driver not to repeat the behaviour in future. Of note, however, though many drivers described that they frequently respond in this way when they encounter poor driving, a handful of these drivers described

that these responses made them feel foolish, or immature, and that their response was futile, because it did not appear to have the intended effect on the target driver.

These findings appear consistent with evidence from Lennon and Watson (2011), who observed similar remarks in a different sample of drivers. Further, these findings also fit well within the framework provided by Weiner's attribution theory, which argues that aggression is more likely to be regarded by the aggressor as justified where the target of aggression is considered to be responsible for their behaviour. Arguably, if a motorist perceives that another driver has behaved poorly, they are likely to perceive that the target driver is responsible for causing the provocative event to happen, based on their ostensibly poor driving.

Based on the various ways drivers described the purpose of their responses in Studies 1 and 2, Study 3 used quantitative methods to identify different purposes of responses to provocative events. Two of these purposes were considered to reflect aggressive intentions: intentions to modify behaviour by criticising, and hostile responses intended to threaten, antagonise or annoy another driver. While it was noted in Studies 1 and 2 that drivers who described more antagonistic responses still described their hopes that the target driver would learn that their behaviour was inappropriate, as described in Study 3, it is possible that the extent to which cognitive processing affects each of these aggressive responses may differ depending on the purpose of the response: while both responses many be intended to teach a lesson, drivers who approach this by antagonistically creating a nuisance for the driver may do so with less conscious processing than drivers whose approach is to convey criticism.

Further, findings from Study 1 and Study 2 also suggested that there may be shared assumptions about the purpose of aggressive driving behaviours. Specifically, comments from drivers who reported having received an aggressive responses from another motorist perceived the intentions of the aggressor as being somewhat similar to the way drivers who reported instigating an aggressive response described their intentions: as a criticism. That is, drivers who perceived they had been treated aggressively described believing that their driving had been unjustly criticised, or attacked.

Perceiving driver aggression as a criticism may stem from the well-documented tendency to consider one's own driving skills as better than others (see section 2.4.2). Specifically, when some drivers instigate acts of aggression, it is

possible they may feel justified in doing so not only because the ostensibly poor behaviour warranted it, but because they perceive themselves as a good driver, and thus in position to comment on someone else's. In contrast, based on evidence that aggression is often used to restore ego where it has been threatened (described in section 2.2.3.2), it is possible that when some drivers who consider their own driving behaviour as better than others perceive they have been on the receiving end of another driver's aggressive behaviour, they may consider it an attack on their driving behaviour that threatens their driving ego. Thus an alternative or perhaps complementary explanation regarding the purpose of aggressive driving responses is that drivers may use aggression to restore or protect the image they have of themselves as courteous, skilled drivers in response to a perceived attack on their driving skill. To that end, it is in this respect that the findings of the current program of research may be able to reconcile the statistics documented in Chapter 2 highlighting an overlap between drivers who report being the victim of driver aggression, and those who report perpetrating it: for drivers who consider driver aggression as a way of communicating criticism, "victims" may also be "perpetrators" because they perceive that their driving has been unfairly criticised, and they are justified in retaliating with their own aggressive counter-response.

6.3. Theoretical and practical implications of the research findings

The aim of the current program of research was to explore the role of cognition in driver aggression with a view to informing the further development of a conceptual model for understanding it based on the General Aggression Model. Chapter 2 highlighted that traffic collisions are often regarded as being the result of deficits in visual perception or reaction time; however, Stack (1956) argued that psychological processes such as driver's attitudes, beliefs, emotions and judgment play more of a role in contributing towards collisions than driving skills or abilities. These processes have received relatively little empirical attention within the driver aggression literature, and thus were explored as part of the current program of research. Consistent with Stack's argument, the findings of the current research highlighted some common ways that drivers conceptualise their driving environment that may affect their perception of events, and provided some preliminary evidence to suggest effects of these cognitions on driver aggression.

The need for comprehensive model of driver aggression stemmed from gaps identified in the literature concerning the relevant the theory that had been applied to driver aggression research. Models such as Shinar's Frustration-Aggression approach to driver aggression (1998) rely on earlier conceptions and theories of aggression that have limited capacity to account for the cognitive processes involved in driver aggression. To overcome this, the proposed model in the current research was based on the GAM, a well-validated theory of general human aggression, to incorporate the influence that person-related and situational factors have on driver aggression through the cognitions they generate. The findings of the current research present some important implications for the further development of the model.

Firstly, the concept of driver etiquette was a prominent theme to emerge in the current research, with findings suggesting that for some drivers, aggressive behaviour is a response to perceptions that others have been discourteous drivers. As described in section 6.2 above, the notion of driver etiquette discussed in the current research appears to be closely related to the concept of civility: polite, respectful and courteous behaviour that facilitates appropriate, smooth interactions in society. Thus these findings appear to highlight that the driving environment is fundamentally, a social interaction and is subject to many of the same forces that underpin other social interactions. Accordingly, one implication of the current findings is that theories that apply to understanding social phenomenon may be relevant to understanding driver behaviour and useful both for development of the model and future research.

Yagil (2001) found that a negative image of other drivers was a stronger predictor of driver aggression than attributions, and suggested that these findings may reflect a self-fulfilling prophecy. The current results would appear consistent with Yagil's suggestion and present some implications for the model. A self-fulfilling prophecy is a phenomenon whereby an individual's expectations create their reality (Merton, 1948). That is, individuals cause an event or behaviour to happen by anticipating that it will: their expectations about events, behaviour, or even people, inadvertently affect their behaviour towards them in such a way that their expectations are confirmed (Darley & Fazio, 1980; Jussim, 1986).

Driver aggression as a self-fulfilling prophecy may be a valid interpretation of the current results. To elucidate, some drivers considered other motorists' behaviour as substandard, but widespread such they appeared to expect to encounter poor driving behaviour (see section 4.7.1). Accordingly, these drivers may take to the road

anticipating that they will encounter poor driving behaviour, and based on this expectation, are primed to noticing poor behaviours in their driving environment, which is likely to then reinforce their existing belief. Furthermore, some drivers responded to instances of poor driving by criticising the target driver's behaviour, to teach them a lesson. However, based on the current results, it is possible that the target driver may consider the aggressive behaviour directed towards them as an unwarranted criticism, to which they may retaliate with their own aggressive counter-response. The counter-response from the target driver is then likely to further reinforce the initial driver's existing belief that driving standards are poor.

Thus when the findings are considered together, it is possible that drivers who hold negative beliefs and cognitions about other drivers may be inadvertently perpetuating some of the very behaviours that they consider to be poor. Thus the cyclical process of driver aggression may reflect a self-fulfilling prophecy underpinned by drivers' beliefs. It is in this sense that the proposed model could also be conceptualised as a framework for understanding how driver aggression behaviours become reinforced through activation of a self-fulfilling prophecy. To that end, the amendment shown in Figure 6.1 to the model is proposed.

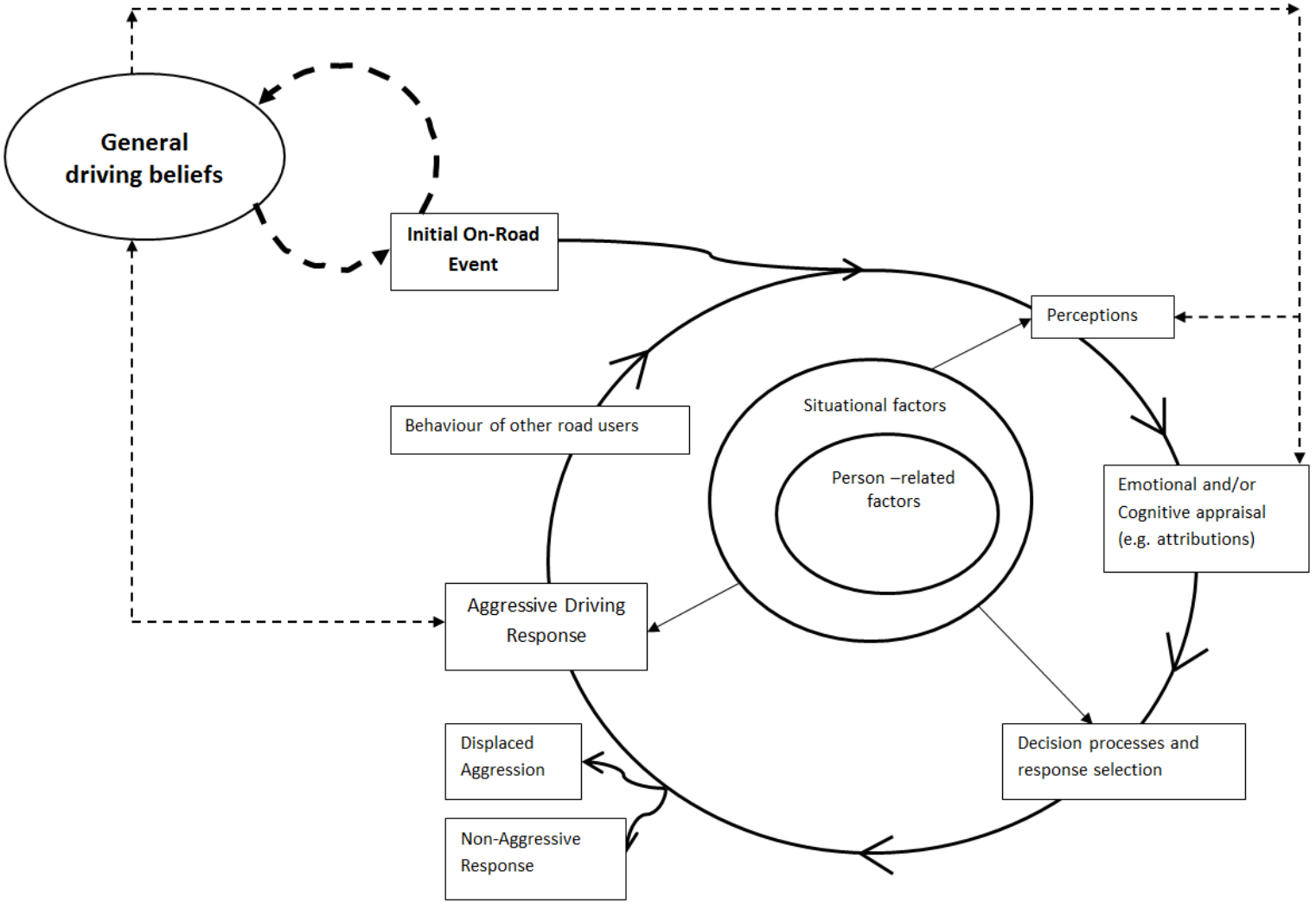

Figure 6.1. Amendments to the proposed model to reflect self-fulfilling prophecy.

Due to confirmation bias, a motorist's way of looking at the driving environment is likely to influence what types of on-road events are noticed in his or her regular driving, which will reinforce the original beliefs and inform perceptions and appraisal of it. These appraisals will then influence any subsequent behavioural response, which will also be informed by the beliefs drivers have about the driving environment.

Additionally, the proposed model was intended to capture the potential for escalation of aggressive events. Although escalation was not directly tested in the current research, those drivers who discussed events that appeared to escalate suggested that each driver involved in the event perceived the other as being responsible for causing it, and thus the other driver's aggressive response appeared to be regarded as an unwarranted attack, and aggression in retaliation was thus justified. As such, this finding would suggest that a perception that one's driving has been unfairly criticised may fuel this cyclical process of aggression.

In addition to implications for the proposed model, the current findings also present implications for the issues surrounding defining driver aggression outlined in section 2.4.1. To explicate, as discussed in sections 3.12.1 and 5.5.3, based on the definition of driver aggression adopted in the current research, it is possible that driver aggression may not be as prevalent as self-report surveys (e.g., AAMI, 2011) would suggest. Alternatively, it is also possible that the estimated prevalence of driver aggression in the current research is an underestimate. As such, while it is acknowledged that the definition of driver aggression employed in the current research is not the only available definition of driver aggression, the findings support arguments by Dula and Gellar (2003) that there needs to be a move towards definitional consistency within the driver aggression literature. Without consistency in the way that driver aggression is defined, establishing accurate prevalence rates will remain problematic as will comparisons across studies within the scientific literature.

The findings of the research also have potential implications for policy. Firstly, the findings of the current research would suggest that policy makers should devote more attention and resources to understanding non-violent driver aggression. As described in section 2.4, despite the focus of driver aggression research tends to be on understanding the causes of violent driver aggression, arguably because the risk of serious injury as a result of violent driver aggression is obvious. In contrast, non-

violent driver aggression, which does seem to be common, appears to be regarded as an inconvenience rather than a threat to safety, and accordingly, has received comparatively less attention. The current findings suggest that minor provocations are common experiences in driving, and non-violent responses are likely for most drivers. However, some drivers in the current study described their willingness to engage in risky behaviour, ostensibly to teach drivers a lesson for their rude or poor behaviour, which highlights that some drivers may be prepared to risk theirs, and others safety in response to minor provocations. This would suggest that non-violent driver aggression is more than just an irritation or inconvenience: it may be increasing crash risk. As such, policy makers should consider providing more funding towards research seeking to understand non-violent driver aggression. Furthermore, funding should also be directed towards highlighting the dangers of non-violent driver aggression to motorists through education campaigns, with a view to changing driver perceptions that there are not likely to be consequences from their acts of driver aggression. For example, one such campaign could draw on the findings of the current research suggesting drivers' tendency to perceive themselves as a good drivers may be implicated in driver aggression. Education campaigns could capitalise on these perceptions by appealing to drivers' desires to appear to be good drivers. To elucidate, a television advertisement could depict a situation showing a driver being tailgated and then depict two alternative ways they could respond: aggressively, by slamming on the brakes and resulting in a collision, or by letting the driver pass. The advertisement could conclude with a slogan or statement to the effect of "we know you're a good driver: don't let someone else risk your good driving history", or "cut them some slack, even good drivers make mistakes sometimes."

Current findings highlight that there could be a need for policy makers to regulate the quality and training standards of those who provide driving instruction to young drivers, as they may be inadvertently promoting negative beliefs about other drivers. In Australia, many young drivers are predominantly supervised by, and learn to drive from their parents (Scott-Parker, Watson, King, & Hyde, 2011), and evidence demonstrates a relationship between parents' driving styles and their children's subsequent driving behaviour (Bianchi & Summala, 2004; Fleiter, Lennon, & Watson, 2010; Prato, Toledo, Lotan, & Taubman-Ben-Ari, 2010). As such, it is likely that parents who drive aggressively or dangerously, or have negative

views of other drivers are providing aggressive driving models for their children. Furthermore, drivers in Queensland are currently not required to re-sit examinations (either practical or theoretical tests) to renew their licences, thus parents' knowledge of the road rules may be outdated.

Further, although it is not mandatory in Queensland to receive driving lessons under the supervision of a qualified driving instructor, accredited driver training is largely a self-regulated industry: driving instructors do not have to complete continued training to maintain their qualifications, many are self-employed, and there are no processes in place to review or assess the quality of training that instructors provide. Consequently, driving instructors, too, may have their own negative views about drivers, which they may inadvertently pass on to students. As such, policy makers should consider regulating who can provide training to young drivers, to help reduce the chances for poor driving practices (e.g., negative beliefs, aggressive or dangerous driving) being modelled for them. In doing so, driver training for young drivers could include mandatory education about appropriate driver etiquette to highlight that driver etiquette is not just a courtesy; it can have implications for their safety. Specifically, driver training could include examples of the types of events that appear to be considered discourteous (e.g., cutting off, slow driving), and how responses to perceptions of discourteous behaviour may increase crash risk. To illustrate using an example, training programs could highlight that travelling under the speed limit is regarded by some drivers as inattentive, and that drivers behind may perceive that the slow motorist is not showing consideration towards how their driving may affect others. This would allow drivers to both understand why other drivers may respond aggressively to them when they are driving slowly, and what their own thought processes may be when they experience anger from being stick behind a slow driver. To consolidate this, training programs could then highlight how responding aggressively to slow driving (e.g., by tailgating) is likely to be perceived by the slow driver (e.g., as a criticism), and could ensue a dangerous counter-response (e.g., driving slower, slamming on the brakes).

Additionally, the findings of the current program of research have highlighted the important role that cognitive factors appear to play in driver aggression, seemingly, above and beyond personality characteristics. As such, the findings would suggest that interventions to reduce driver aggression should adopt a Cognitive-Behaviour Therapy (CBT) based approach that focuses on changing driver

cognitions and encouraging a more forgiving and optimistic appraisal of other driver's behaviour.

CBT approaches are based on the view that psychological distress is sustained by cognitive factors and that emotional and/or behavioural problems are maintained by dysfunctional or problematic cognitions (Beck, 1970; Ellis, 1962). Accordingly, CBT-based therapeutic strategies posit that by changing the problematic cognitions, problematic behaviour and/or emotional distress will also change. CBT is currently one of the most widely used therapeutic techniques in psychology and a wealth of empirical evidence exists demonstrating strong support for the efficacy of CBT in treating a range of issues including, but not limited to, substance abuse, anxiety disorders, chronic pain and fatigue and insomnia (Beck & Haigh, 2014; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012).

Of relevance to the current research, a recent meta-analysis by Hofmann et al. (2012) of over 279 studies found that the strongest support for CBT-based approaches was in the treatment of anger control and aggression issues. Therefore, CBT based approaches could be effective in the treatment of driver aggression. To elaborate, as part of CBT-based approaches, CBT aims to first help people become aware of maladaptive thoughts so that they can then be challenged (Meichenbaum, 1977) with many CBT-based interventions drawing on Bandura's theory of Self-Regulation (1991). This theory suggests that self-monitoring is integral to behaviour change as it involves paying deliberate attention to, and recording, the particular aspect of an individual's behaviour they wish to change. That is, in order to effectively modify behaviours, individuals need to draw awareness to their own actions, the conditions under which they occur and their effects in both the short and long term. One area where this theory has been successfully applied is in clinical weight-loss interventions where individuals seeking to lose weight are generally required to keep a food and exercise diary to help identify their own behaviour patterns. A recent meta-analysis (Burke, Wang, & Sevick, 2011) of weight loss interventions that incorporate self-monitoring found that there were significant associations between self-monitoring and the use of techniques such as keeping a diary.

Applying this reasoning to the driving context, it is possible that CBT- based interventions to reduce driver aggression could begin by requiring drivers to keep a diary, to monitor their own driving behaviour, and bring greater awareness to the

situations that trigger anger and aggression as well as the thoughts that accompany them. Following this generation of greater awareness, CBT-based interventions could then begin the process of challenging these thoughts. However, it must be noted that these are suggestions only and the effectiveness of such strategies would need to be explored empirically in future research.

6.4. Strengths and limitations

As with any research, there are strengths and limitations that must be acknowledged. A key strength of the program of research was the use of the strong and well-validated theoretical framework provided by the General Aggression Model. Prior to the current program of research, the existing body of driver aggression research lacked a uniform, theoretical approach due to the use of models for understanding driver aggression that were based on outdated theories of human aggression. To overcome this, the current research adopted the perspective espoused in the GAM, which is an empirically well-validated model of human aggression, to understanding aggression in the driving context. The GAM, through its focus on interactions between person-related, situational, cognitive variables, was considered to offer strong potential to account for aggression in the driving context.

A second strength was the approach the program of research took to addressing the research questions. Three studies, each building on one another were used to address existing gaps in knowledge regarding the role of cognition in driver aggression, before applying the knowledge gained from those studies towards a preliminary investigation of the model. To that end, an additional strength of the research was the use of qualitative techniques to explore an under investigated area. Adopting qualitative techniques to explore drivers' experiences with and thoughts regarding driver aggression was able to shed light on how drivers themselves conceptualise the driving environment, thus allowing the preliminary investigation of key constructs of the model conducted in Study 3 to be based on information provided by drivers themselves. Further, the use of qualitative techniques was able to generate new knowledge, thus making a unique contribution to the literature.

Further, strengths in the research are apparent in the use of novel, 'real world' methods of data collection: driver diaries in Study 1 and video vignette using naturalistic footage in Study 3. As described, many other studies exploring driver aggression have used hypothetical, scenario based methods, which have well-

documented limitations. The use of diary techniques and video vignettes was a way of overcoming these limitations to enhance the validity of the findings. The use of online diaries allowed drivers to provide their thoughts on incidents they had recently encountered in their driving, which is likely to have improve the accuracy of recall, reduce the influence of social desirability responding stemming from the presence of other people (researcher and/or other participants), and is likely to have provided a more realistic snapshot of the events drivers experience in their regular driving that asking drivers to recall particular aggressive driving instances that they recall in the driving history. Additionally, while video vignettes using naturalistic footage did present some issues in the current research (discussed below), it is likely that realism of the events presented to participants was greater than if the same event was presented using a written description.

There are also a number of limitations that must be recognised. First of all, the program of research relies on data that is self-reported by drivers themselves. Given that it is human nature to present oneself in the best possible light, the results may be skewed by social desirability biases. However, based on the findings of the present research suggesting that drivers feel their aggressive behaviours are justified, and given that some drivers openly discussed on-road events that described their own undesirable behaviour (e.g., almost causing a collision), it is possible that some drivers may not feel the need to adjust their descriptions of their on-road behaviour to appear more socially acceptable.

There are limitations that may have results from a self-selection bias in the samples. First, although the media release that was used to help recruit participants for this study was a cost-effective way of reaching a wide and diverse range of drivers across Queensland, some of the articles that were published from this release include direct reference to driver aggression. As such, some participants would have been aware of the study's interest in aggression which may have affected the results. Moreover, it is possible that the sample of drivers who took part in the studies comprising the program of research may have either had grievances about driver behaviour they wished to express, or were particularly alert to aggressive cues. Additionally, there may also be limitations stemming from the representativeness of the samples used in the studies. Specifically, recent reports from the Queensland Government (Queensland Government Statistician's Office, 2015, 2016) show that the median age in Queensland is 36.3 years old and for every 100 females, there are

99.1 men. The mean age of participants across the three studies ranged between 39.88 to 40.48 years old, suggesting that the sample was representative in terms of age. However, there were more females than males in all three studies. As such, the samples cannot be regarded as representative of the gender breakdown in Queensland. However, given that the extant literature suggests that gender does not influence whether or not one engages in non-violent driver, gender was not a focus of the current study and significant gender differences were not to be expected.

The use of new and novel technologies, namely dashcams and online survey hosting software in the current program of research presents both strengths and limitations that must be acknowledged. Firstly, the use online surveys throughout the research presented with several advantages: they provided an opportunity to capture large and diverse samples of drivers in a simple, time-efficient manner. Further, online survey software helped to protect participant anonymity, which was considered particularly important in facilitating open and honest reflections about the events participants were reporting on the driver diary study. To that end, hosting the diaries through online survey software allowed for participant responses to be received in a timely manner, which in turn assisted in allowing the research to promptly identify potential interview participants. However, as noted in the discussion of strengths and limitations surrounding Study 3, there were glitches in the software that inadvertently resulted in three items being omitted from the anger rumination scale. Thus although online surveys offer many practical advantages, they are not without weaknesses to which researchers should be alert to.

Similarly, the use of dashcams to present participants with video vignettes rather than written vignettes undoubtedly offered advantages to the research by increasing the realism of the events depicted. However, as dashcams only offer a limited perspective to be captured, it is possible that driver's perceptions of the events depicted in these vignettes may have been distorted by the narrow view provided. Although as these technologies continue evolve, to it is likely that ways to overcome this will become apparent, in the current study, it meant that an entire triggering event condition had to be excluded from analyses, due to substantial variation in the way the triggering event (slow driving) was perceived. To that end, the unexpected, but necessary exclusion of a large number of drivers in Study 3 is likely to have adversely affected the statistical power of the analysis.

6.5. Contribution to the research

The current program of research had four key aims: to explore the cognitions and cognitive processes involved in driver aggression; identity the types of events that trigger driver aggression and why drivers regard them as provocations; and explore the purposes of aggressive driving response. In addressing these aims, the research has provided several important contributions to the driver aggression literature.

First, previous literature has typically focused on exploring person-related and situational determinants of driver aggression, with psychological factors such as cognition receiving comparatively little attention. Thus the current research has made an important contribution to the literature by exploring the role of cognition in driver aggression. Using qualitative techniques, the current research was able to provide insight into some shared ways of conceptualising the driving environment that may affect driver aggression through their influence on perceptions of on- road events. In doing so, the findings not only drew attention to these cognitions, but highlighted the important effect perception and appraisal of events appears to have on behaviour: there did not appear to be differences in the types of events reported by drivers who responded aggressively and events reported by drivers who did not respond aggressively, but there were noticeable differences in the way they were perceived and appraised by these drivers. Furthermore, there appeared to be an association between these cognitions and responses to events, highlighting the value of understanding the role of cognition in enhancing understanding the causes of driver aggression.

Second, until recently, little research had explored the types of events that are associated with driver aggression or the reasons drivers consider these events to be provocative. There appeared to be an implicit assumption in much of the literature that the reason particular events (e.g., cutting off) are associated with driver aggression is because they are dangerous. As such, the findings of the current research have contributed to the literature by offering an alternative explanation based on evidence: for some drivers, their aggressive responses to on-road events stem from their perceptions that a motorist has failed to show appropriate driver etiquette.

Third, using an informed conceptual definition of the construct the current research has made a contribution towards gauging the prevalence of non-violent driver aggression. As noted in Chapter 2, establishing the prevalence of non-violent driver aggression has historically been problematic, because estimates will vary according the behaviours used to operationalise driver aggression, and research has tended to focus on violent aggression. The findings of the current research suggest that minor provocations are common experiences for many drivers, and non-violent responses to them are likely. Moreover, some drivers who did respond aggressively, presumably to teach drivers a lesson, described a willingness to engage in risky behaviours (e.g., speeding up to close a gap, tailgating). This finding suggests that some drivers may be prepared to risk theirs, and others safety in response to minor provocations, thus the program of research has made an important contribution to the literature by highlighting that non-violent driver aggression may be increasing crash risk.

Fourth, the current research has made an important contribution to the literature by providing insight regarding the underlying purpose or intentions of drivers' behaviour. It has highlighted that driver aggression appears to be intended to teach a lesson, or may be a response to ego threats.

Fifth, the research has made contributions to the methodologies used to study driver aggression. Rather than rely on hypothetical scenarios, the program of research adopted data collection methods that were designed to enhance the external validity of the findings. In doing so, the current research highlighted some new, novel methods of data collection that may help to generate new knowledge that will further enhance understanding of driver aggression.

Finally, the current research has provided a preliminary investigation of the key constructs of a comprehensive model for understanding driver aggression; applying them towards understanding the underlying motivations for aggressive driving behaviours. In doing so, it has provided an important contribution to the literature by laying the foundation for the continued investigation of this model for understanding driver aggression.

6.6. Future directions

Although the research has made some important contributions to the driver aggression literature, it has also identified a number of areas requiring further

investigation. First and foremost, while the findings of the current research generally appeared to support the proposed model, additional research is needed to explore and refine it further. Approximately sixty percent of the variance in behavioural responses was left unaccounted for in the current preliminary investigation of the model, however, interactive effects between variables at each stage of the model were not investigated in this exploratory study (see section 5.2). As such, investigating the interactive effect of the factors with the potential to influence driver aggression may help explain more variance and contribute towards a greater understanding of the causes of driver aggression.

To that end, the current program of research conducted a preliminary investigation of key constructs of the model, and focused on addressing gaps in the literature surrounding one of the key constructs of the model: the cognitions involved in driver aggression. As described in section 1.7, relative to the other components of the proposed model, knowledge regarding the role of cognitions was limited. Therefore, in the absence of sufficient knowledge concerning of the key constructs of the model, it was not considered possible to meaningful to conduct a full test of the interactional model. Rather, the research thoroughly explored and investigated this key construct of the model, to provide information that will allow future research to progress towards a full test of an interactional model. As such, with the knowledge generated by the current research, future research should move towards conducting a test of the proposed model.

Additionally, exploring the interactive nature of the proposed model may explain why person-related factors did not appear to be strong influences on driver aggression in the current research: they may affect aggression through their influence on the cognitions they generate. In particular, anger rumination had significant moderate correlations with some of the cognitions identified, highlighting that exploring interactions between anger rumination and cognition may be a promising avenue of future research. Further, two of the factors that emerged in Study 3 that were used as dependent variables only had two items and were, therefore, not technically ‘factors’. As such, future research should consider replicating this study, using additional items reflecting these factors, to determine whether a similar factor structure emerges. Doing so would also provide a further step toward developing a standardised measure of the purpose of driver’s responses to provocative events. Moreover, to the best of the author’s knowledge, the current study is the first of its

kind to operationalise driver aggression in terms of intention to harm. Consequently, the purposes underpinning drivers' responses described in the current research are unlikely to be exhaustive. Accordingly, future research should continue to explore the purpose of aggressive driving responses, to help better understand the motivations underpinning driver's responses to provocations.

The current research was able to identify some of the shared cognitions regarding the driving environment, and further, was able to provide some preliminary evidence suggesting that these cognitions are associated with driver aggression. Given that cognition was an under-explored area of driver aggression research, further research is required to continue to understand these cognitions and investigate their influence on driver aggression. In particular, it would be interesting for further research to explore and understand the negative beliefs regarding other drivers that were apparent in the current research, to determine if the same beliefs can be identified in other samples or if this belief is specific to Queensland drivers and the Queensland driving culture. Certainly, a recent study by Stephens (2016) also found that Australian drivers tend to have negative attitudes about other drivers, suggesting that there may be a culture of driver aggression in Australia. In line with this, it would also be of interest for future research to explore the role of driving culture in Australia. As described in section 2.10.2, driving culture has been defined as the "common practices, expectations, and informal rules that drivers learn by observation from others in their communities" (Lonero, 2007, pg.7). Although the current program of research aimed to uncover and understand individual attitudes and beliefs about driving behaviour, these beliefs and attitudes are likely to be influenced by the broader cultural milieu in which they occur. Therefore, driving behaviour is likely to be partly shaped by driving culture, as driving culture provides drivers with an additional framework for interpreting on-road events and determining what behaviour is acceptable. Furthermore, when the role of driving culture is considered alongside findings of the current research whereby many of the behaviours that drivers described as aggressive may not be considered aggressive in other countries (e.g., horn honking), an exploration of Australian driving culture warrants further attention.

Additionally, there were some findings in the current research (see section 4.7.3) that suggested a 'Belief in a Just World' (BJW; Lerner, 1965) may be associated with greater levels of aggression, Some drivers appeared to justify their aggression on the

basis that the target driver 'got what they deserved'. These findings are in contrast to a recent study by Nesbit, Blankenship and Murray (2012), which found a negative relationship between BJW and driving anger and aggression. These authors suggested that perhaps a stronger BJW protects against driving anger and aggression because motorists trust that others will get what they deserve and, thus, do not feel the need to retaliate. Given these mixed findings, it would be interesting for future research on the role of cognition in driver aggression to further explore the influence of a BJW.

Further, the knowledge gained from the current program of research regarding these shared cognitions highlighted a self-fulfilling prophecy that may perpetuate driver aggression. Accordingly, the current research suggests that the proposed model not only offers a mechanism for understanding the processes that unfold when driver aggression is triggered, it may also provide a framework for understanding how driver aggression scripts become reinforced in memory. Therefore, continued investigation of these cognitions should assist in both understanding how they contribute to instances of driver aggression, but also to help understand how driver aggression behaviours become reinforced in memory.

Additionally, the concept of psychological entitlement has been identified as a person-related factor that may influence driver aggression. As described in section 6.2.1, the concept of civility closely resembles the notion of etiquette described in the current research, and evidence of relationships between incivility and aggression, and entitlement are apparent in literature. If entitlement is associated with incivility and incivility is in turn associated with aggression; entitlement may form the basis for the breakdown in etiquette that the current result suggest triggers aggression for some drivers. Furthermore, the concept of moral identity was explored in the current research to further investigate the unexpected findings that emerged from Study 1, where some drivers appeared to describe a sense of satisfaction from not responding aggressively to provocative behaviour. Although the findings of the present research did not reveal any associations between moral identity and driver aggression, given that the pattern of responses that comprised the satisfaction theme in Study 1 appeared to protect against an aggressive response, it would be of interest for future research to continue to explore what personality traits this may relate to.

As described in section 6.4, the use of novel, 'real world' approaches to data collection represents a strength of the program of research. Given that technology is

continually evolving, future research should seek to continue to use technology/capitalise on advances in technology. This may help to overcome the issue of lack of audio recording that represented a limitation of Study 3 in the current program of research (refer to section 5.5.4 above).

Finally, as described in Chapter 1, situational factors were considered to be beyond the scope of the current research. As such, it is recommended that future research begin to explore these factors, to determine the extent to which situational factors contribute to driver aggression in the context of the model.

6.7. Concluding comments

The program of research documented in the preceding dissertation has explored the role of cognition in driver aggression to inform the further development of a theoretical model for understanding driver aggression. It has documented some of the ways that drivers conceptualise their driving environment and interpret events in their driving environment, and found that they appear to be important in influencing driver aggression. Additionally, it has provided some preliminary evidence to suggest that the proposed model offers the potential to enrich current understanding of driver aggression.

The program of research investigated the purpose of responses to on-road provocations, to explore whether they reflect aggressive intentions to harm. Among the many results outlined in the preceding dissertation, one of the most salient findings suggested that the purpose of some drivers' responses is to criticise the target driver's behaviour, with the view that the negative feedback will provide the impetus for the target motorist to improve their driving. However, the findings also highlighted that some recipients of driver aggression feel unjustly criticised, and can respond with their own aggressive retaliation. To that end, the thesis will conclude with an infamous quote from Mahatma Gandhi, which succinctly encapsulates this finding:

"An eye for an eye only makes the whole world blind."

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Part Two: Log Books

Some the questions in this research refer to 'negative interactions'. For the purpose of this research, 'negative interaction' is defined as "any interaction with another driver on the road where you experienced (even fleetingly), any level of discomfort or negative emotion."

These interactions:

May not have resulted in an accident, or caused you or someone else any physical harm.

May have only been temporary, did not have a negative impact on your day

- May seem extremely trivial compared to other events happening in your life.

However, since this research aims to study a wide range of negative interactions experienced while driving, when asked to recall negative interactions, please refer to any on-road experiences which brought up negative emotions for you.

Please Remember. Please answer all questions open and honestly, as your responses are completely confidential, subject to legal requirements. Should you report a *serious criminal offence* (e.g., physical assault, grievous bodily harm, purposely damaging another vehicle), legal orders may compel the researcher to disclose the information, or the researcher may have a statutory obligation to disclose any criminal activity that is revealed

Driving is something most of us do on a daily basis, however some drivers report experiencing minor annoyances, stress and frustrations during their daily drive. This can be because driving requires us to communicate with other drivers and communication processes are open to misunderstanding. While most communication processes allow for the safe progression of traffic, some are used to express negative emotions and frustrations.

Take a few minutes to reflect upon the driving you have done in the past two days (i.e., the last 48 hours) to think about any negative interactions and experiences you've had during this time. These events may not be all that serious compared to some other days, but we are interested in all annoyances and negative events experienced. Please keep in mind that the focus of this research is *your* thoughts and feelings on the behaviour you engage in or encounter while driving.

With this in mind, please respond to the following questions.

1. Thinking about the past two days of driving, how many negative driving interactions have you experienced?

0	☐
1	☐
2	☐
3	☐
4	☐
5	☐
6	☐
7	☐
8	☐
9	☐
10+	☐

2. Thinking about the most negative driving interaction you experienced on the road in the past 48 hours, please briefly describe what happened .Even if you think the interaction isn't all that serious, we are interested in people's perceptions of a wide range of annoyances and negative events experienced on the road.

3. Of all the interactions you experienced, why do you regard this one as the most negative?

4. What was happening prior to this interaction occurring? Please focus on describing how you were feeling prior to the negative interaction with another driver and the purpose of your trip. (e.g., I'd just dropped my kids off at school at little later than normal, and I was driving along the Pacific Highway, when I got caught in traffic. I was frustrated because I was already running late for work and then...).

5. What were the very first initial thoughts or key words that went through your mind during this interaction?

6. What emotions do you recall experiencing when this interaction occurred? Please indicate by ticking the corresponding box if you felt that emotion.

Angry	☐	Irritated	☐
Annoyed	☐	Outraged	☐
Threatened	☐	Scared	☐
Anxious	☐	Nervous	☐
Frustrated	☐	Sad	☐
Puzzled	☐	Confused	☐
Powerful	☐	Indignant	☐
Exhilarated	☐	Satisfied	☐
Glad	☐	Intimidated	☐

7. Of the above emotions you've ticked, please specify which one you felt the strongest?

8. Why do you think this interaction happened? That is, what do you think caused it?

9. What did you do in response to this interaction? Please briefly explain why you responded in this way?

   a. What other responses (if any) did you consider or think about?

b. Is this how you might typically respond to an event like this?

c. How did you feel after responding in this way?

Appendix B: Video study questionnaire

The following questionnaire will involve you completing some questions about your personality, viewing a video of a common driving situation and answering some questions about your thoughts on it. It should take approximately 40 minutes to complete, and responses are completely confidential. Please be aware that there are no right or wrong answers. Before commencing, please ensure that:

- You have read and understood the information sheet (see above) regarding this project and have had any questions answered to your satisfaction
- You understand you are free to withdraw at any time, without comment or penalty.
- You understand that you can contact the Research Ethics Unit on [+61 7] 3138 5123 or email ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project.

Please check the box below to confirm that you have read and understood the above information and then click next to continue.

☐ I have read and understood the information provided to me.

Before you get started, we'd like to know a little about you. The following questions are for statistical purposes only and cannot be used to identify you. All information you provide is anonymous and confidential.

Are you?	
☐	Male
☐	Female

What is your current age? (Please answer with numbers only)

..... Years

How many years have you held a driver's licence? (Please answer with numbers only)

..... Years

Where did you learn how to drive?	
☐	Australia/Oceania
☐	Europe/UK
☐	North America
☐	South America
☐	Africa
☐	Asia

In a typical week, how many hours would you spend driving? (Please round up to the closest hour. For example, if your typical driving is between 5-6 hours per week, please answer 6).

..... Hours

What is the main purpose of most of your driving?	
☐	Commuting to and from work
☐	Leisure or running errands (please include driving children in this category)
☐	Driving as part of your job (e.g., real estate agent, sales representative)
☐	Other .....

What is the highest level of education that you have completed?	
☐	Postgraduate Degree
☐	Undergraduate Degree (including Honours)
☐	TAFE, Trade or other vocational training
☐	Senior High School (Year 12)
☐	Junior High School (Year 10)
☐	Primary School

What is your current employment status?	
☐	Employed full-time
☐	Part-time/Casual
☐	Self-Employed
☐	Student
☐	Retired
☐	Full-time parent or carer
☐	Unemployed
☐	Other.....

The questions in the following section are about your general experiences in everyday life and are not specific to driving. A few notes about these questions:

- There are no right or wrong answers.
- It should take you approximately 15-20 minutes to complete.
- Please do not spend too much time on any one statement: choose the answer the best describes how you generally feel or react **most** of the time. Please answer according to what reflects your actual experience, rather than what you think your experience should be.
- You will not be able to go back and change your answers once you have clicked 'next' to move to the next page.

The statements below are about your experiences in everyday life and are not specific to driving. Using the scale below where 1- *Almost Always* and 6- *Almost Never*, please indicate how frequently or infrequently you have each experience.

	1 *'Almost Always'*	2	3	4	5	6 *'Almost Never'*
I could be experiencing some emotion and not be conscious of it until sometime later	☐	☐	☐	☐	☐	☐
I break or spill things because of carelessness, not paying attention, or thinking of something else	☐	☐	☐	☐	☐	☐
I find it difficult to stay focused on what's happening in the present	☐	☐	☐	☐	☐	☐
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	☐	☐	☐	☐	☐	☐
I tend not to notice feelings of physical tension or discomfort until they really grab my attention	☐	☐	☐	☐	☐	☐
I forget a person's name almost as soon as I've been told it for the first time	☐	☐	☐	☐	☐	☐
It seems I am "running on automatic" without much awareness of what I am doing	☐	☐	☐	☐	☐	☐
I rush through activities without really being attentive to them	☐	☐	☐	☐	☐	☐
I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there	☐	☐	☐	☐	☐	☐
I do jobs or tasks automatically, without being aware of what I'm doing	☐	☐	☐	☐	☐	☐
I find myself listening to someone with one ear, but doing something else at the same time	☐	☐	☐	☐	☐	☐
I drive places on "automatic pilot' and then wonder why I went there	☐	☐	☐	☐	☐	☐
I find myself preoccupied with the future or the past	☐	☐	☐	☐	☐	☐
I find myself doing things without paying attention	☐	☐	☐	☐	☐	☐
I snack without being aware that I'm eating	☐	☐	☐	☐	☐	☐

The questions below are about your experiences in everyday life and are not specific to driving. For each question, please indicate using a scale where 1- *'extremely uncharacteristic*' and 5- '*extremely characteristic'* how characteristic that statement is of you

	1 *'Extremely Uncharacteristic'*	**2**	**3**	**4**	**5** *'Extremely Characteristic'*
I am sometimes eaten up with jealously	☐	☐	☐	☐	☐
At times I feel I have gotten a raw deal out of life	☐	☐	☐	☐	☐
Other people always seem to get the breaks	☐	☐	☐	☐	☐
I wonder why sometimes I feel so bitter about things	☐	☐	☐	☐	☐
I know that my "friends" talk about me behind my back	☐	☐	☐	☐	☐
I am suspicious of overly friendly strangers	☐	☐	☐	☐	☐
I sometimes feel that people are laughing at me behind my back	☐	☐	☐	☐	☐
When people are especially nice to me, I wonder what they want	☐	☐	☐	☐	☐

The following questions are about your experiences in everyday life and are not specific to driving. Using the scale below where 1- Almost Never and 4- Almost Always, please indicate how characteristic the statement is of you.

	1 *'Almost Never'*	**2**	**3**	**4** *'Almost Always'*
I re-enact the anger episode in my mind after it has happened	☐	☐	☐	☐
When something makes me angry, I turn this matter over and over in my mind	☐	☐	☐	☐
Memories of even minor annoyances bother me for awhile	☐	☐	☐	☐
Whenever I experience anger, I keep thinking about it for awhile	☐	☐	☐	☐
After an argument is over, I keep fighting with this person in my imagination	☐	☐	☐	☐
Memories of being aggravated pop up into my mind before I fall asleep	☐	☐	☐	☐
I have long living fantasies of revenge after the conflict is over	☐	☐	☐	☐
When someone makes me angry, I can't stop thinking about how to get back at this person	☐	☐	☐	☐
I have daydreams and fantasies of violent nature	☐	☐	☐	☐
I have difficulty forgiving people who have hurt me	☐	☐	☐	☐
I ponder about the injustices that have been done to me	☐	☐	☐	☐
I keep thinking about events that angered me for a long time	☐	☐	☐	☐
I feel angry about certain things in my life	☐	☐	☐	☐
I ruminate about past anger experiences	☐	☐	☐	☐
I think about certain events from a long time ago and they still make me angry	☐	☐	☐	☐
I have had times when I could not stop being preoccupied with a particular conflict	☐	☐	☐	☐

Below are a collection of statements that people have commonly used to describe themselves. They are not specific to driving. Using the scale below where 1- Almost Never and 4-Almost Always, please indicate how you generally feel or react.

	1 *'Almost Never'*	**2**	**3**	**4** *'Almost Always'*
I am quick tempered	☐	☐	☐	☐
I have a fiery temper	☐	☐	☐	☐
I am a hot-headed person	☐	☐	☐	☐
I get angry when I'm slowed down by others' mistakes	☐	☐	☐	☐
I feel annoyed when I am not given recognition for doing good work	☐	☐	☐	☐
I fly off the handle	☐	☐	☐	☐
When I get mad, I say nasty things	☐	☐	☐	☐
It makes me furious when I am criticised in front of others	☐	☐	☐	☐
When I get frustrated, I feel like hitting someone	☐	☐	☐	☐
I feel infuriated when I do a good job and get a poor evaluation	☐	☐	☐	☐

Listed below are some traits that may describe a person:

- Caring
- Compassionate
- Fair
- Friendly
- Generous
- Hardworking
- Helpful
- Honest
- Kind

The person with these characteristics could be you, or it could be someone else. For a moment, visualise yourself in the mind of the kind of person who has these characteristics. Put yourself in the mindset of how that person would think, feel and act. Once you can clearly imagine yourself in the mindset of this person, please answer the following questions:

	1	2	3	4	5	6	7
It would make me feel good to be a person who has these characteristics	☐	☐	☐	☐	☐	☐	☐
Being someone who has these characteristics is an important part of who I am	☐	☐	☐	☐	☐	☐	☐
A big part of my emotional well-being is tied up in having these characteristics	☐	☐	☐	☐	☐	☐	☐
I would be ashamed to be a person who has these characteristics	☐	☐	☐	☐	☐	☐	☐
Having these characteristics is not really that important to me	☐	☐	☐	☐	☐	☐	☐
I strongly desire to have these characteristics	☐	☐	☐	☐	☐	☐	☐
I wear clothes that identify me as having these characteristics	☐	☐	☐	☐	☐	☐	☐
The types of things I do in my spare time identify me as having these characteristics	☐	☐	☐	☐	☐	☐	☐
The kinds of books and magazines I read identify me as having these characteristics	☐	☐	☐	☐	☐	☐	☐
The fact that I have these characteristics is communicated to others by my membership in certain organisations	☐	☐	☐	☐	☐	☐	☐

The questionnaires are now complete. You will now view the video of the driving situation.

A few hints and tips for accessing this video:

- The video will work best using Google Chrome or Firefox. It will work with Internet Explorer and Safari, but you may experience slowness. Please ensure your Internet Browser and Media/Flash player software is up to date. Software that is out of date can interfere with the video
- The video is only very short, approximately 40 seconds
- There is no sound on the video
- You can watch the video a few times if you feel you need to see it again to get an idea of what's happening, but one you have clicked 'next' to move to the next page, you will not be able to return to it.
- Please view it in 'Full Screen'. To do this, click the icon on the far right at the bottom of the screen. When the video is finished, press the 'ESC' key to return the video to normal size and continue with the survey.

Please click 'next' to continue to the video.

The footage you are about to see was obtained by attaching a small camera inside the windscreen of a vehicle. The camera was left in the vehicle for a month while the driver went about their usual, everyday driving. The following situation occurred on a two lane road in a suburb 20 minutes north of Brisbane.

- It was a 60KM zone on a weekend.
- The driver of the vehicle containing the camera was obeying the road rules.

When you're watching the footage, visualise yourself as the driver of the vehicle containing the camera. Imagine what it would be like to be in their position when this happened. How would you feel? What thoughts would be going through your head? How would you react? Picture yourself driving along the road and the following happens:

Click 'next' to continue

Remember, you won't be able to come back to this, so make sure you feel comfortable that you remember what happened.

So that we can best understand the responses you will provide to the questions, please briefly describe your perceptions of the situation you believe transpired in the video you just watched. There are no right or wrong answers, just your perceptions of what you believe happened.

.....

.....

.....

.....

We've asked people to list words that they would use to describe the behaviour shown in the video situation. Some of the most common ones are listed below. Using the scale below, please indicate the extent to which you believe each word describes the behaviour of the situation shown in the video.

	1 *'Not at all'*	**2** *'A little'*	**3** *'Moderately'*	**4** *'A lot'*
Mistake	☐	☐	☐	☐
Unaware	☐	☐	☐	☐
Rude	☐	☐	☐	☐
Arrogant	☐	☐	☐	☐
Deliberate	☐	☐	☐	☐
Careless	☐	☐	☐	☐
Inconsiderate	☐	☐	☐	☐
Dangerous	☐	☐	☐	☐
Impatient	☐	☐	☐	☐
Courteous	☐	☐	☐	☐
Disappointing	☐	☐	☐	☐
Common	☐	☐	☐	☐

Driving often stirs up a range of emotions for people. Listed below are some of the most common emotions people report experiencing when they encounter situations similar to the one shown in the video. Our emotional response to driving situations often depends on how we are feeling at the time we are driving. For the purpose of responding to the following questions, imagine that you are driving right now. That is, imagine you are driving the vehicle that contained the camera, and respond to the questions accordingly. Using the scale below, please indicate the extent to which you believe you would experience each of the following emotions in response to the scenario shown in the video

	1 *'Not at all'*	**2** *'A little'*	**3** *'Moderately'*	**4** *'A lot'*
Indifferent	☐	☐	☐	☐
Angry	☐	☐	☐	☐
Annoyed	☐	☐	☐	☐
Threatened	☐	☐	☐	☐
Anxious	☐	☐	☐	☐
Frustrated	☐	☐	☐	☐
Puzzled	☐	☐	☐	☐
Irritated	☐	☐	☐	☐
Outraged	☐	☐	☐	☐
Scared	☐	☐	☐	☐
Nervous	☐	☐	☐	☐
Disappointed	☐	☐	☐	☐
Confused	☐	☐	☐	☐
Offended	☐	☐	☐	☐
Satisfied	☐	☐	☐	☐
Intimidated	☐	☐	☐	☐

Driving involves us sharing the road with many others, which means we are often thinking about the behaviour of other drivers. For the next set of questions, we're particularly interested in your beliefs, thoughts and perceptions of the other driver that was shown in the situation you just watched in the video (the silver Honda CRV). Similar to the last set of questions, how we feel about and react to such situations depends on how we feel at the time we're driving. Again, we'd like you to answer the questions based on how you are feeling right now. Remember, there are no right or wrong answers. Please answer the questions openly and honestly. Please do not spend too much time on any one question.

The following questions are about your thoughts on the behaviour of the other driver shown in the video scenario you just watched. We're interested in your thoughts on why you think the driver of this vehicle drove the way they did. Using the scale below, please indicate the extent to which you agree or disagree with the statement about the other driver. Although it's possible that any of these statements could be true, or the cause could be a combination of these statements, please try to carefully think about which one you believe would be the most likely reason for or the greatest contributor to the driver's behaviour and respond accordingly.

	1 *'Strongly Disagree'*	**2** *'Disagree'*	**3** *'Somewhat Disagree'*	**4** *'Somewhat Agree'*	**5** *'Agree'*	**6** *'Strongly Agree'*
The driver's behaviour was understandable given the design of the road	☐	☐	☐	☐	☐	☐
It probably happened because the driver misjudged the situation or just made an honest mistake	☐	☐	☐	☐	☐	☐
It happened because that's just the way that driver is. Their behaviour reflect the type of person they are	☐	☐	☐	☐	☐	☐
There must have been some sort of extenuating circumstances (like being held up earlier in their journey or attending to a passenger emergency) happening that contributed to the driver's behaviour	☐	☐	☐	☐	☐	☐

Using the scale below, please indicate the extent to which you agree with each statement

	1 *'Strongly Disagree'*	**2** *'Disagree'*	**4** *'Agree'*	**5** *'Strongly Agree'*
The driver's behaviour was deliberate	☐	☐	☐	☐
The driver intended for their behaviour to annoy, inconvenience or somehow upset you	☐	☐	☐	☐

We're interested in the way you would respond if you experienced a similar situation to the one shown in the video. Listed below are some ways others have indicated they might respond. Using the scale below, please indicate how likely or unlikely you would be to do each of the following in the same situation.

	1 *'Very unlikely'*	2 *'Unlikely'*	3 *'Somewhat likely'*	4 *'Likely'*	5 *'Likely'*
Gesture rudely or obscenely at the other driver	☐	☐	☐	☐	☐
Engage in a behaviour intended to deliberately annoy or inconvenience the other driver	☐	☐	☐	☐	☐
Yell or swear (but only inside your vehicle)	☐	☐	☐	☐	☐
Follow the driver and physically confront them	☐	☐	☐	☐	☐
Follow the driver to confront them verbally and give them a piece of your mind	☐	☐	☐	☐	☐
Follow them for a little while	☐	☐	☐	☐	☐
Roll your eyes	☐	☐	☐	☐	☐
Tailgate	☐	☐	☐	☐	☐
Honk your horn	☐	☐	☐	☐	☐
Insult, ridicule or question the driver (but only from inside your vehicle)	☐	☐	☐	☐	☐
Yell at, swear at or insult the driver verbally as you pass them	☐	☐	☐	☐	☐
Overtake or move away from the driver	☐	☐	☐	☐	☐
Take a deep breath and continue driving	☐	☐	☐	☐	☐
Flash your lights	☐	☐	☐	☐	☐
Shake your head	☐	☐	☐	☐	☐
Pull over	☐	☐	☐	☐	☐
Gesticulate (but not obscenely)	☐	☐	☐	☐	☐
Glare at or give the driver a nasty look	☐	☐	☐	☐	☐

Of the above responses, please indicate which one you believe would be your most likely response. If your most likely response was not listed, please describe it below. Why do you think this would be your most likely response? How would responding in this way make you feel? Please choose one response only.

.....

.....

Thinking about your most likely response (from above), please rate the extent to which you would want each of the following outcomes to be achieved as a result of your response:

	1 *'Not at all'*	**2** *'A little'*	**3** *'Moderately'*	**4** *'A lot'*
Indicate to the other driver that you don't approve of their behaviour	☐	☐	☐	☐
Alert, or warn the other driver to a dangerous situation	☐	☐	☐	☐
Vent your own feelings	☐	☐	☐	☐
Communicate your thoughts on the situation to the driver	☐	☐	☐	☐
Indicate to the driver they need to amend their driving immediately	☐	☐	☐	☐
Encourage the other driver to reconsider or think about their driving behaviour	☐	☐	☐	☐
Get yourself away from the driver	☐	☐	☐	☐
Send the driver a message concerning their poor driving behaviour	☐	☐	☐	☐
Inconvenience or annoy the other driver	☐	☐	☐	☐
Help get you to your destination faster	☐	☐	☐	☐
Express your feelings	☐	☐	☐	☐
Threaten or intimidate the other driver	☐	☐	☐	☐

This is the final section of the questionnaire. These questions regard your beliefs and thoughts about driving in general. They are not specific to the situation shown in the video. There are no right or wrong answers. Please do not spend too much time on any one question: choose the response that closely reflects your beliefs most of the time. Please click 'next' to continue.

Listed below are a number of statements that reflect general beliefs about driving. Using the scale below, please indicate the extent to which you agree or disagree with each of the following.

	1 *'Strongly Disagree'*	**2** *'Disagree'*	**3** *'Somewhat Disagree'*	**4** *'Somewhat Agree'*	**5** *'Agree'*	**6** *'Strongly Agree'*
I seem to encounter the same types of poor driving behaviour most times I drive	☐	☐	☐	☐	☐	☐
I take to the road knowing that I will encounter bad driving	☐	☐	☐	☐	☐	☐
Bad driving is so common that it almost seems 'normal'	☐	☐	☐	☐	☐	☐
Drivers who do the wrong thing on the road should be called out on their poor behaviour	☐	☐	☐	☐	☐	☐
Those who do foolish things on the road should be made aware of the impact they are having on others	☐	☐	☐	☐	☐	☐
If someone's driving inconveniences, annoys and/or angers me, I feel I should communicate this to make them aware	☐	☐	☐	☐	☐	☐
Drivers should always be alert to, and aware of how their behaviour is affecting others	☐	☐	☐	☐	☐	☐
I show consideration to other drivers, and expect they will be considerate in return	☐	☐	☐	☐	☐	☐
Rude and inconsiderate driving is frustrating, and can make me feel angry or upset	☐	☐	☐	☐	☐	☐
I expect that motorists will show good manners on the road, and can feel annoyed when this expectation is not met	☐	☐	☐	☐	☐	☐
It is the height of inconsideration to deliberately cause inconvenience to another motorist	☐	☐	☐	☐	☐	☐

I'm not really thinking much about other driver's needs when I drive, I'm only really concerned with getting to where I need to go	☐	☐	☐	☐	☐	☐
Drivers of 4WD's are bullies, who use the size of their vehicle to intimidate other drivers	☐	☐	☐	☐	☐	☐
Elderly drivers are so overcautious when they drive, they actually end up creating a safety hazard	☐	☐	☐	☐	☐	☐
'P-Platers' and young drivers behave recklessly when they drive, and seem to think they are invincible, even though their behaviour is dangerous	☐	☐	☐	☐	☐	☐
I pride myself on being a more considerate and civil driver than most others	☐	☐	☐	☐	☐	☐
Responding out of anger or frustration to another driver's poor behaviour would make me just as bad as they are	☐	☐	☐	☐	☐	☐
I feel proud that I obey the road rules when most drivers these days seem to disregard them	☐	☐	☐	☐	☐	☐
The fact that I am a polite and courteous driver is clearly communicated to other motorists by the way I drive	☐	☐	☐	☐	☐	☐
The way I drive shows others that I am a well-mannered driver	☐	☐	☐	☐	☐	☐
I lead by example in making sure that the way I drive reflects the level of consideration and courtesy that people should display on the road	☐	☐	☐	☐	☐	☐

Appendix C: Media Release –Study 3 (Video study)

22 August 2014

Rude and inconsiderate drivers who break 'driving etiquette' rules are more likely to anger and frustrate other drivers, than those who act dangerously on the roads, a new QUT study has found.

The results from QUT's Centre for Accident Research & Road Safety - Queensland (CARRS-Q) study, which investigated the thought processes involved in driver aggression, were presented at an international psychology conference in Paris recently.

CARRS-Q researcher Lauren Shaw said the study recorded the driving experiences of 209 Queensland drivers for one week, and found violating 'driving etiquette' was most likely to result in reports of anger and frustration.

"As part of the study drivers were asked to record the negative events they experienced while driving, and what they thought about other drivers and how that made them feel," she said.

"The results surprisingly showed that rude and inconsiderate behaviour on the road was more likely to evoke feelings of anger and frustration than those who drove dangerously."

Ms Shaw said when drivers failed to behave politely on the roads or showed poor driver etiquette, people responded in two ways.

"There were those who responded with aggressive behaviour and those that don't respond at all, despite feeling angry," she said.

"Those who do take aggressive-type action such as beeping the horn or raising the finger felt their behaviour was justified, to teach a lesson to someone who violated driving etiquette.

"Drivers who reported responding with behaviours like honking their horn expressed that they wanted their actions to communicate to another driver that their behaviour was rude and they should think about others.

"We also found that there were a number of drivers who, despite reporting they felt quite angered by poor driving etiquette, didn't respond at all because they felt a level of superiority over the other driver.

"They refrained from an aggressive response because they felt behaving aggressively would lower themselves to the level of someone that they thought was rude."

Ms Shaw said understanding the trigger of driver aggression was important to be able to develop strategies to reduce driver anger on the roads. Her next study will look at the psychological processes involved in driving.

"We want to look more closely at drivers' beliefs, thoughts and perceptions in response to common driving situations," she said.

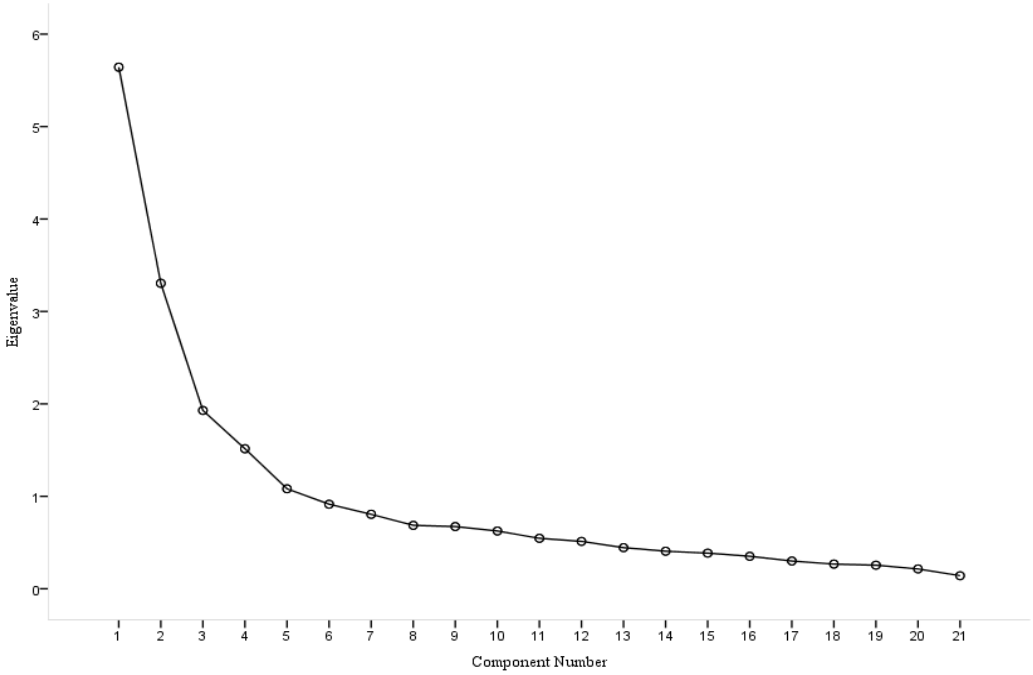
The study is an online survey, takes about 40 minutes to complete and is open to Queensland drivers over 18. Those who complete the study will receive a $20 Coles/Myer voucher.

To register to participate, follow the link here

Those who register will be given email access to the survey.

Appendix D: Scree plots for Principal Components Analysis

Driver Cognitions and Expectations:



Purpose of behavioural response: